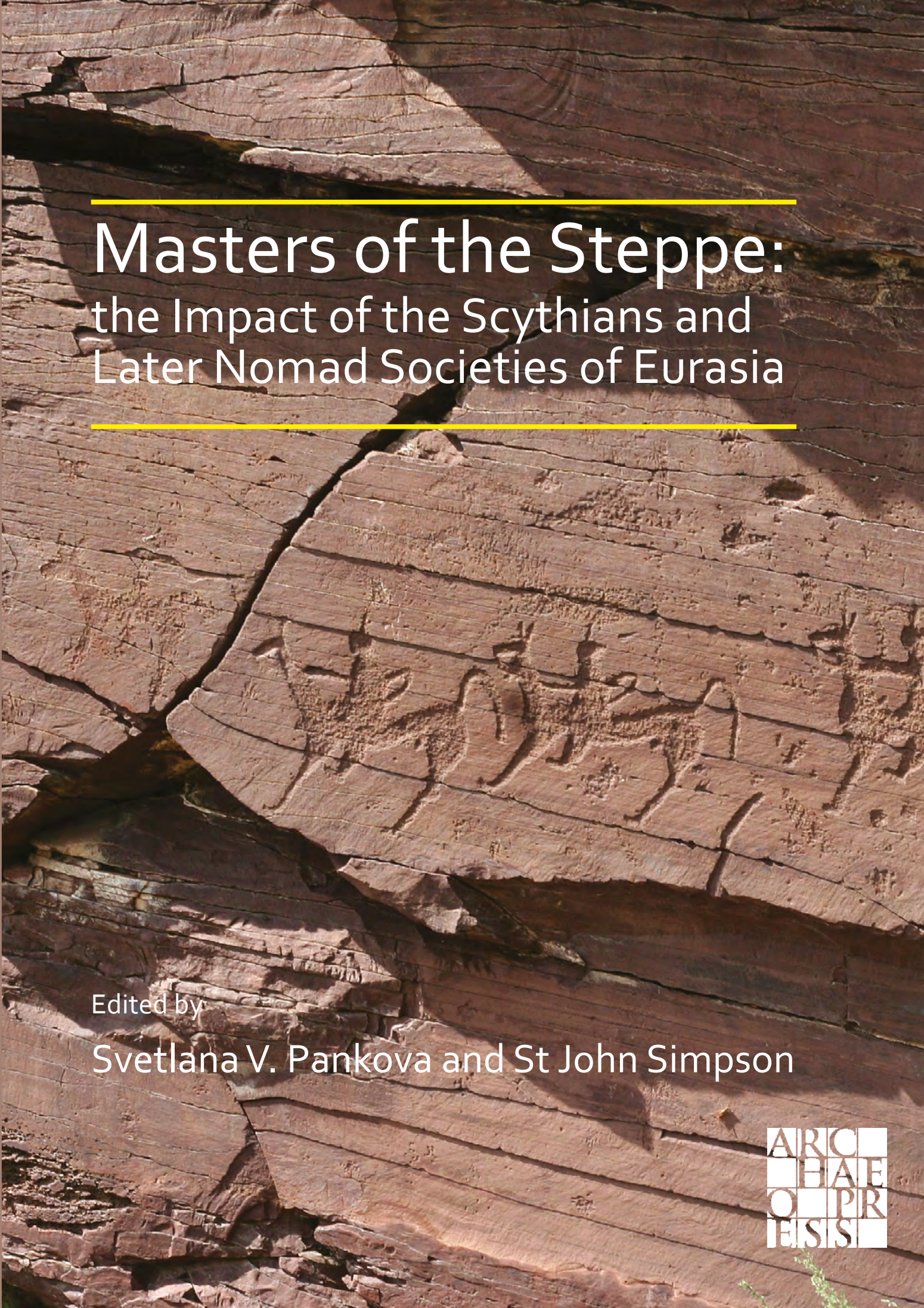

Masters of the Steppe:
the Impact of the Scythians and Later Nomad Societies of Eurasia

Edited by
Svetlana V. Pankova and St John Simpson

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Cover illustration: Petroglyphs from the post-Scythian period at Moiseikha mountain on the right bank of the Yenisey, Minusinsk Basin (photograph: E. Miklashevich)

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Foreword

Hartwig Fischer

It gives me great pleasure to contribute a foreword to this compendium of new research and thinking by such a vast group of authors on what it meant to be a Eurasian nomad. To most of us this is a deeply unfamiliar concept. As we are predominantly products of urban education systems our often-Eurocentric world views sometimes struggle to comprehend nomads, whether they are from Eurasia, Arabia or, indeed, modern travellers or displaced populations who have left their homes. Unconsciously we may judge these citizens of the world by our standards and try to impose levels of control on their movement which is contradictory to their roving lifestyle.

Our international museums are filled with sculptures, decorative arts and narratives of indigenous peoples, products of many of the world's cultures, both ancient and modern. However, many institutions struggle to represent the history of the nomad to its fullest extent. In an effort to better explore this history the British Museum had the privilege of working with the State Hermitage Museum to jointly develop the exhibition *Scythians: warriors of ancient Siberia*, which was on show at the British Museum from September 2017 to January 2018.

The exhibition was a revelation to many of our 130,000 visitors who were able to learn how these ancient pastoral nomads developed an efficient lifestyle so perfectly suited to their steppe environment. The Scythians were warriors indeed, but also skilled horse-breeders, wood-carvers, felt-makers, weavers and traders. The exhibition brought them back to life and restored the colour and tangible heritage to the words of Herodotus, upon whom so much weight and criticism had otherwise been placed.

I am delighted that following the conference at the British Museum in 2017 we are publishing *Masters of the steppe: the impact of the Scythians and later nomad societies of Eurasia* and that it contains the work of so many contributors from across Russia, Ukraine, Moldavia, Romania, Kazakhstan, Mongolia, China, Turkey, France, Germany, Austria, Denmark, Belgium, the Netherlands, America and Britain.

It is the responsibility of institutions such as the British Museum and the State Hermitage Museum to serve as examples of international co-operation and encourage a broader cultural understanding of world history. It is greatly encouraging therefore to develop this publication which has been authored by both rising and well-established scholars who are striving to share knowledge and understanding. The horizons and long-term sustainability of the Eurasian nomad are objectives worth contemplating today, and this volume is a testimonial to that.

Dr Hartwig Fischer
Director, The British Museum

Signage at the entrance to the exhibition *Scythians: warriors of ancient Siberia* (photograph: The British Museum)

Foreword

Mikhail Piotrovsky

The Scythians were an ancient people and their current image is part of the history of Russia, Russian culture and Russian national consciousness. Scythian artefacts form an important and familiar part of the Hermitage collection. The magnificent Kostroma deer is a generally recognised symbol of the Hermitage, its collections, its excavations and its academic research over the centuries. The arrival of Scythian antiquities into the Hermitage made it a universal museum and introduced the subject of the synthesis of cultures into its scientific repertoire once and for all. This subject continues to be part of ongoing academic, cultural and even political debates about Eurasian unity.

The Hermitage exhibits antiquities from Kul' Oba to Pazyryk, discovers sensational new monuments and carries out renewed explorations of previously excavated sites. The Hermitage combines the very latest technological examinations of Scythian weapons, harness decoration and textiles with new art historical approaches to the 'Animal Style' and the chronology of Scythian kings and Scythian military campaigns. This new level of synthesis stands side by side with pioneering approaches in the field of visual exploration and ways in which the museum can display exhibits for the refined and ordinary public.

Scythology has long been an international field of study. The wonderful exhibition that this publication accompanies, a joint venture of the Hermitage and the British Museum, is an excellent example of combined research into the culture of these remarkable nomads. The results of this research and discoveries are worthy of the part played by the Scythians in world culture, and the Scythians are justifiably represented in the multi-faceted work of our two museums as we work together in friendship.

Dr Mikhail Piotrovsky
Director, The State Hermitage Museum

Aerial photograph of the Winter Palace
(photograph: The State Hermitage Museum,
St. Petersburg; photograph by Igor Solovei)

Preface and acknowledgements

Svetlana V. Pankova, St John Simpson

This conference was conceived as part of the public programme associated with the BP exhibition *Scythians: warriors of ancient Siberia* held at the British Museum from 14 September 2017 to 14 January 2018 and, like the exhibition itself, was jointly organised with the State Hermitage Museum. This is reflected in the addition of the forewords by both our directors and we are very grateful to them and their support of curatorial research.

Conferences like this are an essential part of any good exhibition, and a unique opportunity to explore related research questions and subjects which lie outside the strict exhibition narrative. However, it could not have happened without the very generous support of the ERC who supported it as part of the *Beyond Boundaries: Religion, Region, Language and the State* grant awarded to Dr Michael Willis: the organisers and participants alike are deeply grateful to them for this and for providing much-needed administrative support in the form of Serena Biondo who kindly made all the travel and accommodation booking for the participants. Given that we had over 35 speakers attending from multiple countries, including many from Russia and others also from outside the EU, this was a huge task, and we are also very grateful to Dean Baylis, then the senior administrator in the Department of the Middle East at the British Museum, for giving up a lot of his time to help with this. Additional costs were met through event ticketing and the Friends of the Middle East, a small group who very generously support the activities of the Middle East Department at the British Museum. We are very grateful to Jonathan Tubb, Keeper of this department, for kindly authorising this and supporting this volume by granting research leave and travel to Russia on several occasions. Likewise, we thank Dr Andrey Alexeev, head of the Department of Archaeology of Eastern Europe and Siberia at the Hermitage, for his support and interest.

Successful conferences also rely on good logistics and, in this case, we were fortunate as the British Museum Clore venue is well-versed to supporting events of this kind. The audiovisual technicians were always ready and presentations followed smoothly as a result. We are grateful to Freddie Matthews, head of Adult Programmes, for agreeing that this event could be included as part of the public programme, and to the British Museum Visitor Services managers, and the Box Office and Information Desk teams for facilitating this. The conference catering was by Benugo and the coffee-breaks and evening reception were, as always, an important integral part of the three-day event. During the event, our security and visitor operations managers were always on hand to help and avert unforeseen events.

We would also like to thank here the different museums, organisations and individuals who generously supplied images: among them we should single out Rodolphe Olard for bringing our attention to the rare book from which the frontispiece is taken, and for kindly allowing us to photograph and include it. We are also particularly grateful to Dr Svetlana Adaxina, Deputy General Director, and Anastasya Miklyaeva, Head of the Rights and Reproduction Department at the State Hermitage Museum, for their kind permission and very generous waiving of reproduction costs for the numerous images we requested, some of which were taken specially. It is an act of true collaboration which we enjoyed throughout this exhibition project and a model of how great research institutions like our respective museums should work.

The editing of these papers proved a longer and harder task than even we originally anticipated, and most required translation and/or heavy editorial input. In the case of our colleagues from the Hermitage, this task was undertaken as part of the official agreement and we are indebted to Mariam Dandamaeva, Scientific Secretary of the Hermitage, for agreeing to, and kindly overseeing this process. In the case of other papers, much of the translation fell on the shoulders of Ekaterina Paronjan and Dr Georgi Parpulov, and we are very grateful to them for their hard work too. Dr Raphael Wong kindly checked the Chinese literature and citations for the bibliography. We are also hugely indebted to the numerous specialist reviewers we asked to comment individually on the different papers, introduction and conclusion, and for their candid and quick responses. They know who they are, and know that we could not have managed to do this without their great input and support.

We are delighted to report that we had four different publishers' offers to publish the proceedings of this conference, but we opted for Archaeopress Archaeology (Oxford) as we know from past experience that they are a delight to work with and invariably offer a quality product within a quick period of time. We owe David

Davison and Rajka Makjanic, and all their team at Archaeopress, our deepest thanks for the huge work they have put into making sure that this monograph is appropriately designed and produced to ensure its place on the shelves of everyone interested in Eurasian nomads.

As the editors, we thank the many contributors for their papers, the efforts they put into delivering the final versions and their immense patience while they underwent translation, editing, peer review and final production. In the final stages as we were preparing this volume for press, everyone's lives changed around the world because of the appearance of a new virus: the loss of lives, livelihoods and personal freedoms has been a great tragedy. At the time this volume went in press we also heard with our deepest regret that our dear colleague, Dr Sergey Minyaev – a leading researcher in the field of archaeology of the Xiongnu – has passed away in St. Petersburg. He was unable to participate in our conference but his death is a huge loss for the archaeology of Eurasian nomads, and for some of the contributors personally. We dedicate this volume in his memory, hope that our world is restored to normality and that through friendship, dialogue and collaboration we remain strong and positive.

Introduction

> 'The Scythians established a rich nomadic civilisation which stretched from its homeland in Siberia to reach as far as the Black Sea and the edge of China by the fifth century BC. Mobility and mastery of local resources were central to their culture and their achievements, and they represent the first in a sequence of world-class players to emerge from this region, as they were the forerunners of the Sarmatians, the Huns, Turks and Mongols'.

This was the concept for the 2017/18 British Museum exhibition *Scythians: warriors of ancient Siberia*, sponsored by BP, which was the genesis of this volume of conference proceedings. This exhibition was the highlight of a series of cultural events organised in London to commemorate the world-changing event of the Russian Revolution a century before. Three years earlier, some of the leading museum directors in the UK discussed how it might be possible to mark this: the Royal Academy went on to mount an exhibition on the art of post-Revolutionary Russia,[1] the British Library focused on the history of the Russian Revolution itself,[2] Tate Modern showed the works of Russian graphic artists and photographers of the 20th century,[3] and the Royal Collection highlighted the close relations between the Romanovs and the British royal family.[4]

The challenge posed within the British Museum was how to create an exhibition which would complement these, yet play to our core audiences who are particularly drawn to the ancient world. The solution was equally clear: work closely with the State Hermitage Museum, develop an exhibition around the Scythians and explore part of the deep history of Russia, and this was the concept put forward by the BM co-editor of this volume. The aim was to look at one of the oldest known cultures from Russia which had a resonance with Western visitors, yet was so unfamiliar and from so remote a place that they would feel immediately intrigued and drawn into learning more. Like all successful storyboards the message was simple: bring stunning and unfamiliar objects together from a place few of our visitors will have been to, yet heard much about, and then challenge their perceptions about what that place was really like and let them emerge with a new and positive set of ideas about it, its people and their culture. However, the aim was not just another exhibition on Scythian gold from the Black Sea region, of which there have been many in Europe and America.[5] We also wanted to include a wide range of spectacular organic finds from Pazyryk, including some which have never travelled before, add new curatorial insights, and embrace the latest research to illustrate the latest discussions about Scythian origins in the east as Herodotus himself stated:

> 'It is claimed that when the Scythians, who were nomads at the time, living in Asia, were so hard pressed in a war with the Massagetans that they abandoned their homeland and crossed the River Araxes into the land of the Cimmerians – for the country that the Scythians currently inhabit is said, back in ancient times, to have belonged to the Cimmerians'.[6]

Greek and Roman authors likened the Black Sea to the shape of a Scythian bow[7] and, writing at the end of the first decade AD, the Roman poet Ovid described the world of the Eurasian steppe which lay beyond as the very opposite to that of the familiar farming world of the Classical world:

> 'There is a place on the farthest border of icy Scythia, a gloomy and barren soil, a land without corn, without trees. Sluggish Cold dwells there and Palloor, Fear, and gaunt Famine'.[8]

This contrast between treeless steppe and fields lies at the heart of the dichotomy between settled and non-settled peoples. It has exercised numerous studies and led governments to impose controls on the movement of pastoralists or, in more extreme cases with the consolidation of state power in new nation-states,

[1] *Revolution: Russian Art 1917–1932* (11 February–17 April 2017).
[2] *Russian Revolution: Hope, Tragedy, Myths* (28 April–29 August 2017).
[3] *Red Star Over Russia: A Revolution in Visual Culture 1905–55* (8 November 2017–18 February 2018).
[4] *Russia, Royalty & the Romanovs* (9 November 2018–28 April 2019).
[5] The first and only previous exhibition in Britain was also at the British Museum (Morris 1978): it was a significantly smaller and much more traditional show although one the BM co-editor remembers well from visiting in his youth.
[6] Herodotus, *The Histories* 4.11; cf. also *Diodorus Siculus, Library of History* 2.43: 'Next in order, however, we shall discuss the Scythians who inhabit the neighbouring lands. For these people at first possessed little territory for themselves; but later, having expanded gradually through fighting and courage, they acquired extensive lands, and their nation advanced to great dominion and glory. For at first they dwelt entirely along the Araxes River, small in number and despised because of their insignificance. But having one king of old who was fond of war and who excelled in military prowess, they won land for themselves in the mountainous country as far as the Caucasus, and in the plains along the ocean and Lake Maeotis [Sea of Azov] and the rest of the country all the way to the river Tanais [Don]'.
[7] Dan 2013.
[8] Ovid, *Metamorphoses* 8.788–91.

Prepare to meet the most fearsome warriors you've never heard of...
The BP exhibition
Scythians warriors of ancient Siberia
Supported by BP
The British Museum

Figure 1. Marketing poster advertising the exhibition, Waterloo station, 19th September 2017

enforce sedentarisation with sometimes devastating effects on social structures and the tribal economy.[9]

How does one actually display an alternative economy like this? The Scythians are one of the greatest nomad cultures of antiquity with strong resonances: exhibitions, like films and books, need a strong start and an equally powerful ending, yet differ as they rely on objects to support the narrative. The proposal began with an exhibition scope paper giving the concept quoted above, key messages, visit outcomes, outlining the interpretative approach and the exhibition narrative with the key objects on the 'wish list'. Regular meetings and curatorial discussions with colleagues in the State Hermitage Museum then followed, the exhibition entered the museum schedule, sponsorship sought, contracts signed, the press and marketing campaign launched, designs finalised, digital content developed, blogs posted and audio recordings made. Formative evaluation with focus groups and visitors to the museum indicated the following: for 76% of the sample, knowledge of the Scythians was zero to very limited, the idea of encountering an unknown ancient culture appealing, and many were attracted by the idea of seeing evidence for the lifestyle of a people, if possible with added experiential effects. Others added that 'Siberia is an exciting word', and 'Siberia gets across that they lived a tough life'. The message was also clear that the exhibition title should be evocative and illustrative, that it should convey a way of life and not be over-academic. Our marketing campaign combined these into a key message that we were doing an exhibition on an ancient people, they were warriors and were from Siberia: the carefully developed lead image added the nuances of a winter sunrise in the east with a vast open flat landscape stretching behind a fierce horseman depicted in detail on gold, and the text indicated the exhibition was in collaboration with the State Hermitage Museum. This strong visual imagery was posted across the London Underground rail network, displayed on posters and banners around the museum, used on the cover of the exhibition catalogue, and adapted as a short animated film played in cinemas, on the museum website and preceding all public programme events in the lecture theatres (Figure 1).

Within the exhibition our introduction was the story of the discovery of amazing gold antiquities in kurgans in southern and western Siberia during the reign of Peter the Great, and how he was inspired by the (since disappeared) collection of the Dutch statesman and repeated mayor of Amsterdam, Nicolaas Witsen (1641–1717), to create his own. These were made over a large area, most likely spanning the Altai region, southern Urals, upper Irtysh river and northern Kazakhstan. Tobolsk was founded as a Russian fortress in 1587 and since 1708 had been a capital of the province of Siberia, so many finds were concentrated there, either bought or taken from teams of *bugrovshiks*. On 3rd August 1787, John Ledyard (1751–1789), the first American to travel across Siberia, remarked in his journal on some kurgans by the river there:

> 'I find near its banks those little mounds of earth, which I at first supposed, but now know to have been the dwelling places of those who inhabited it before the time of the Russians: these were the Bratskoi [Buryat] or the Calmucs. Some of these hillocks have been dug into and laid open – I suppose by some former traveller'.[10]

[9] Bocco 1990; Chatty 1996.

[10] Watrous ed. 1966: 148–49. Ledyard was an explorer with a short temper and died tragically early in Cairo: before travelling from St.

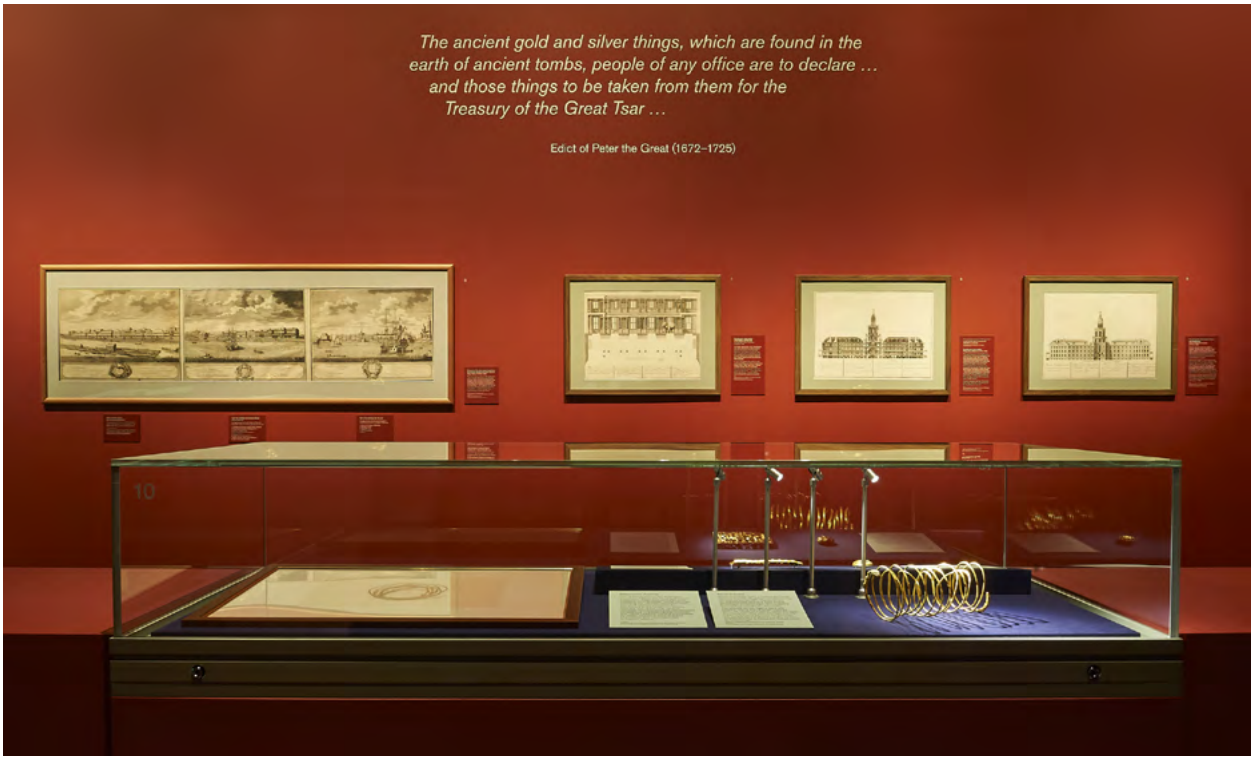
The ancient gold and silver things, which are found in the
earth of ancient tombs, people of any office are to declare …
and those things to be taken from them for the
Treasury of the Great Tsar …
Edict of Peter the Great (1672–1725)

Figure 2. Gold, watercolours and engravings reconstruct St. Petersburg and the artistic response to the discovery of the Siberian Collection of Peter the Great (photograph: The British Museum)

Peter had already demanded that all new finds be sent to him and that looting stop: this was effectively the first piece of legislation protecting cultural heritage in Russia and was highlighted in the exhibition above prints showing the St. Petersburg of his day and opposite showcases containing spectacular pieces from his Siberian Collection (Figure 2). These objects are normally only seen by ticket in the Treasury Rooms of the Hermitage and were displayed alongside little-known 1:1 scaled watercolour drawings of the same pieces from the 'paper museum' of the *Kunstkamera*, which had been commissioned as the first step for an album of engravings which was never completed, and now held in the Russian Art department of the Hermitage. This was the first time the objects and drawings had been shown together, and was revelatory for all to compare the two and see the hands of individual 18th century draughtsmen (Figure 3).[11] But collaborative exhibitions – unlike those in commercial premises – offer many more opportunities than just displaying pieces in another venue: visitors to this opening section quickly appreciated this, as we illustrated the first results of new scientific research on some of these objects, showed for the first time how they were made and should be introduced a second theme of the exhibition: the growing importance of archaeology and scientific research in the understanding of these people without writing (Figure 4).

A curving wall carried projections of late 19th century watercolour drawings by Pavel Yakovlevich Piasetsky (1843–1921) of the south Siberian landscapes crossed by the newly built Siberian Railway: the aim was to lead the visitor seamlessly into the modern era and the environment where these objects were made, used and found (Figure 5).[12] Non-Russians envisage Siberia as filled with negative connotations: bleakness, snow and ice, endless forest and penal colonies. Covering a vast portion of the Russian Federation and spanning many of the country's time zones, it is rich in natural resources, and south of the vast forests there is grassy steppe punctuated by major river valleys with open woodland and the Sayan-Altai mountains. This was the world where the Eurasian nomads dominated with their mastery of the horse and ability to move herds and flocks from areas of deficit to areas of surplus according to the seasonal availability of pasture and water. Bronze Age cattle-herders had previously opened up this region and it was during the 3rd millennium BC that

Petersburg to Kamchatka he was part of James Cook's expedition to the north Pacific in 1776–80 and when in Tahiti had his hands tattooed, which partly explains a comment he wrote in a letter to Thomas Jefferson, dated 19th March 1787, where he writes intriguingly that, when at dinner one night in St. Petersburg, 'we had a Scythian at table that belongs to the royal society of Physicians here: the moment the savage knew me & my designs he became my friend' (Watrous ed. 1966: 124).

[11] None are signed but some are known to have been executed by Andrey Grekov, son of Angileos Delilo, Inspector of Peter's Galley Fleet, who after studying painting at the newly established Academy of Sciences was appointed in 1732 to the Kunstkamera 'to depict various Kunstkamera objects' (Stetskevich 1997: 252); cf. also Printseva 2005: 200–201; Korolkova 2017*a*.

[12] Printseva 2011.

Figure 3. Displaying objects from the Siberian Collection of Peter the Great with original watercolour drawings (photograph: Benedict Johnson)

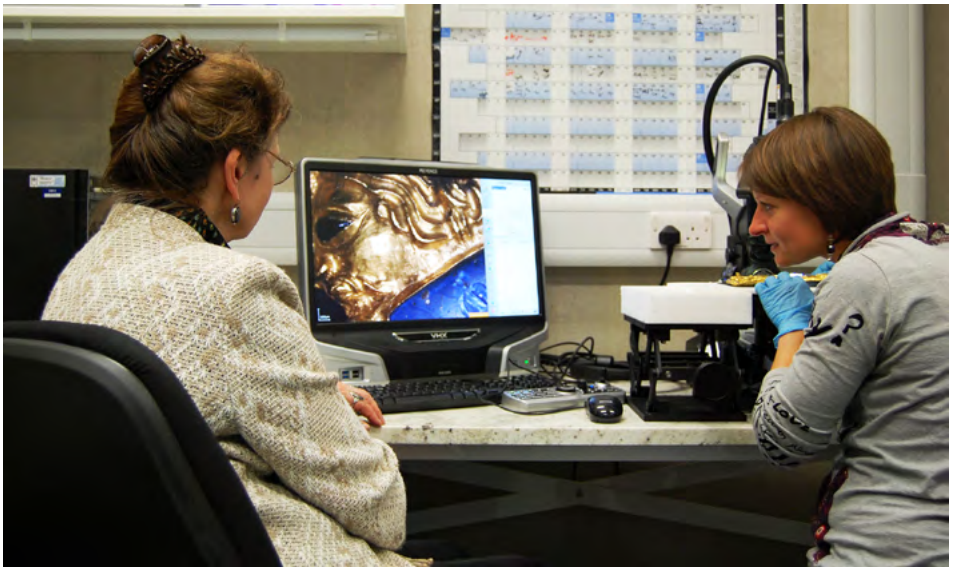

Figure 4. Examining a gold belt plaque under high magnification in the Department of Scientific Research at the British Museum (photograph: Chloe Leighton)

Figure 5. The choral ensemble *Russian Souvenir* sing traditional songs in front of a digital projection of watercolours of Siberia (photograph: Benedict Johnson)

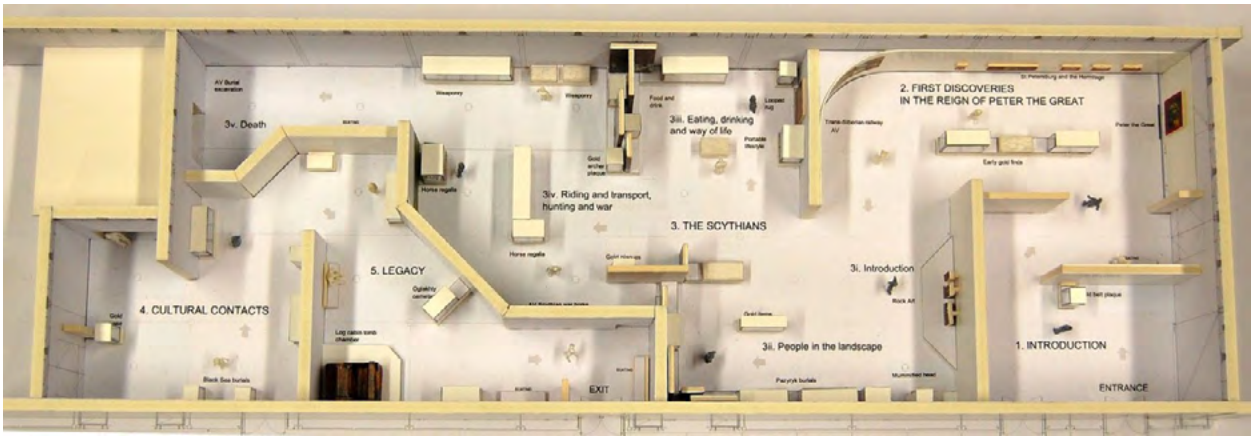

Figure 6. Exhibition model made by British Museum 3D designer Jon Ould (photograph: Chloe Leighton)

it began to act as a broad natural corridor for people, fashions and technologies to flow and connect with the agricultural oases of central Asia and other regions to their south.[13]

In about the 9th century BC the speed of movement and transmission was accelerated with the development of gear designed for comfortable and effective riding of horses: along with weapons and 'Animal Style' art, this is one of the key features of the so-called 'Scythian triad' which was rapidly adopted across the Eurasian steppe. This marks a critical turning point in the development of the pastoral economy and warfare of Eurasia, with rapid and lasting effects on the southern neighbours. Herodotus refers to how the Cimmerians of the north Caucasus 'fled from the Scythians into Asia, and settled in the peninsula where the Greek city of Sinope is now established',[14] and a Late Assyrian prism dated to 673 BC and excavated at Nineveh describes how Esarhaddon 'marched triumphantly from the rising sun to the setting sun' to confront his enemies and 'I put to the sword Ishpaka, a Scythian, an ally who could not save himself'.[15] Another Assyrian document, dated only three years before, describes how the Scythian leader Bartatua requested an Assyrian princess in diplomatic marriage as part of the deal to secure a peace treaty with Esarhaddon.[16]

Written accounts are powerful first-hand testimonies but these are all views written by non-Scythians for their own audiences and raise other questions, as we shall see, about the implications of the events they describe. Moreover, exhibitions rely on more than texts and that is where this exhibition was like no other exhibition before on this topic. It consciously set out to explore what the salient characteristics were of Scythian life and death, how some of their daily crafts were perfectly designed for purpose, and how various forms of 'Animal Style' art and ritual permeated their beliefs and even personal appearance (Figures 6–7). Separate sections explored these topics, with showcases set within a largely open space with sweeping panoramic landscape views designed to evoke the feeling of the Eurasian steppe (Figure 8). There was also the chance to emphasise their pastoral nomadic economy: a fleece found in kurgan 5 at Pazyryk, and lumps of cheese and the remains of the dyed cheetah-fur bag they were kept in from kurgan 2, the latter labelled as 'best before 300 BC' which drew the amused attention of visitors of all ages and occasioned an unscripted remark on English humour in one of the opening speeches (Figure 9). A reconstruction of a miniature tent found in another kurgan at Pazyryk, with the actual charred seeds of cannabis, an incense-burner, hexapod stand and felt canopy created a strong evocation of Herodotus' remark that Scythians 'howl with delight' when they inhaled the smell enhanced by the confined 'hotbox' environment (Figure 10).[17] A leather purse with a full set of finger-nail clippings, probably from the final manicuring of a corpse, triggered other feelings of immediacy, especially as they were displayed alongside fur bags and mirrors, the essential accessories of antiquity (Figure 11). Items of clothing, tattooed human remains and personal tool-kits completed the sense of an archaeological ethnography. Cases of weapons illustrated warfare when competition for resources could not be brokered by dialogue. A large display of horsegear – from a comfortable padded saddle to ritual masks and other expressions of 'Animal Style' art in 2D and 3D – illustrated mobility and complex beliefs of the afterlife and the relationship of man to the natural and supernatural worlds (Figure 12). A log coffin from Pazyryk kurgan 1 – the heaviest and largest object in the exhibition – underlined their concern for care in the afterlife and was exhibited against a reconstruction

[13] Anthony 2007; Frachetti 2008.
[14] Herodotus, *The Histories* 4.12.
[15] Simpson and Pankova eds 2017: 285, cat. 191.
[16] Simpson and Pankova eds 2017: 284, cat. 190.
[17] Herodotus, *The Histories* 4.75.

Figure 7. Visitors are entranced by the rich variety of horsegear and other paraphernalia (photograph: Benedict Johnson)

Figure 8. Creating a sympathetic ambience is essential to any exhibition (photograph: The British Museum)

of the felt which may have been used to surround the corpse while the tomb was being constructed. A log ladder, an improvised mallet, coffin nails and a strip of birchbark used to isolate the tomb roof were exhibited to bring home the processes by which individuals were interred and how the exceptional frozen ground conditions in the high Altai preserve evidence that is missing from elsewhere. The multiple directions of interaction between Scythians and their neighbours formed another section which illustrated how some objects are clearly imports, others are more ambiguous, but in most cases it was the artistic motif which travelled and was re-interpreted in other media on both sides of the fluid boundary between Scythians, Persians and Greeks, and yet a single tomb – whether in the Altai or the Crimea – may contain examples of each. These nomads lived in a rich and well-connected cultural environment

Figure 9. The VIP tour on the opening night stops to admire frozen cheese found at Pazyryk (photograph: Benedict Johnson)

Figure 10. The Scythian lifestyle was not always hardship: evidence for feasting, communal eating and getting high on hemp (photograph: The British Museum)

Every exhibition needs a punchy ending: without it, all the work is wasted, visitors exit through the exhibition shop with no desire to spend, and the word-of-mouth afterwards will be negative or lacklustre. There is a common tendency now for exhibitions to end by dwelling on the current resonances of the subject covered, whether by displaying contemporary art or the political context in the case of cultures in conflict zones. In both cases there is a risk of underwhelming the visitor or over-labouring the connection. Our challenge was that the reasons why or even how the Scythians faded out of history are unclear and too diffuse for a good conclusion. Although 19th century discoveries triggered a 'Scythian revival' in decorative arts, just as they had for Assyria and Egypt, the number of pieces which could be borrowed was too small to have a major impact.[18] A reference to Scythian cannibals on the Mappa Mundi at Hereford Cathedral, the oldest

[18] De Guitaut, this volume; cf. Curl ed. 1994; McCall 2018.

Figure 11. Essential accessories for the afterlife: fur bag, leather and horn containers and polished metal mirrors (photograph: The British Museum)

Figure 12. Visitors stop in front of pole top ornaments and a felted pendant (photograph: Benedict Johnson)

surviving medieval map of the world and dating to *c.* 1300, was too complicated and negative to explore.[19] Napoleon's exasperated remark about the burning of Moscow shows that they had achieved the status of 'the other': 'What a terrible sight! They're burning it themselves ... What a people! These are Scythians!'[20] This was not enough, nor were the opening lines of Alexander Blok's famous poem, 'The Scythians', even though inspired by the October Revolution:

> 'Millions are you – and hosts, yea hosts, are we
>
> And we shall fight if war you want, take heed.
>
> Yes, we are Scythians'.

Attempts to find school exercise books showing the impact of Scythians on the primary education curriculum within Russia proved unsuccessful, occasional images in Russian art or modern postage stamps were not sufficiently strong (Figures 13–14), and a brutal action-fantasy genre Russian film called *The Scythian* – released in Germany as *Rise of the Scythian*

[19] Arrowsmith 2015; the detail is illustrated in Cunliffe 2019: 308, fig. 11.9.
[20] Chateaubriand 1849/50.

Figure 13. Painting by Viktor Vasnetsov (1848–1926), *Battle of the Scythians with the Slavs*, oil on canvas, 1881 (The Russian Museum, St. Petersburg)

Figure 14. Modern postage stamps issued by the Republic of Khakassia entitled *Russian archaeological heritage* and illustrating Scythian and other bronzes

and elsewhere as *The Last Warrior* – came out a year after the exhibition closed (Figure 15).[21]

The answer was to bring the exhibition round full circle by returning to southern Siberia, and update the impact of the first antiquarian discoveries made during the reign of Peter the Great by introducing new archaeological and scientific research. Focusing on the southern Siberian republic of Khakassia, it showed how, after Scythian culture had mainly disappeared in about the 2nd century BC, they were replaced by new Eurasian nomad populations, some of whom had close connections with northern China. It was this Tashtyk cultural group, known only through archaeology as they are absent from contemporary written sources, which offered the chance to leave exhibition visitors with some of their most lasting and unexpected impressions: haunting human heads covered with painted plaster masks, a funerary face veil, a model bowcase with scraps of reused Chinese polychrome silk, a repaired child's fur coat, and the log cabin tomb-chamber in which all were discovered at Oglakhty in 1969 (Figures 16–17). The names and ethnic identity of these people are unknown, and even their absolute dating was unclear until recent radiocarbon analysis.[22] Isotopic analysis of hair plaits hints at the varied diet of individuals as they had evidence for fish, C3 plants (wheat and barley), meat and dairy products,[23] and reused scraps of Chinese silks illustrate the aesthetic

[21] Directed by Rustam Mosafir and filmed in Crimea in 2016, this is a dark story of conflict, betrayal and bloody revenge between rival groups: Scythians, Kievan Rus, Turkic nomads and tree-dwelling Berendey inspired by Mad Max films. The lead character draws on his inner bear at times of rage and the last remaining Scythian tribe are portrayed as wolf-like mercenaries but are the only people not to lie: the bleak ending sees their integrity betrayed with hope buried in a folk-tale vignette within the closing credits. In the official press release, its director stated that 'This is not a historical film in pure form, although its effect occurs about a thousand years ago [sic]. This is a fantasy based on our distant past', and its producer Sergey Selyanov added that 'The Slavic compound is located on the seashore, the Berendey live in a dense forest, and the Scythians live in the middle of a wasteland'.

[22] Pankova *et al.* 2010. A further set of dates was generously financed by the British Museum's Research Board and Department of the Middle East Friends and the results will be published separately.

[23] Shishlina *et al.* 2016.

Figure 15. Promotional marketing for *The Last Warrior*

offers an important case-study in the application of this approach to a pastoral nomadic society about whom we know little else.

Special exhibitions such as this are carefully developed with a curatorial vision, honed through discussion internally and with key partners, in this case curators in the State Hermitage Museum. A Baseline Assessment of the Museum's Research in July 2017 recognised that the museum's exhibitions and associated publications were often ground-breaking and of the highest international significance, but remarked that the number of associated publication outputs could be higher and commented on the lack of publications which discussed critically or reflected on our exhibition processes and their input. This is mainly because exhibitions contain significant investment of intellectual property which may be commercially realised in future touring versions of the exhibition: for instance, the travelling exhibition of treasures from the National Museum of Afghanistan which opened in Paris in 2007 came to the British Museum in 2011, and our design and interpretation was adopted for a fee by the next two venues in Stockholm and Trondheim.[25]

In the present case, it was clear from the outset that this exhibition was bespoke and would never be recreated, despite a request from another national museum. This exhibition was widely considered to be the highpoint in the arts season in London in 2017 with a huge impact on

Figure 16. Visitors realising that the label graphic shows a CT-scan of the man's head beneath the plaster mask in the centre (photograph: Benedict Johnson)

value played by these in a world apparently otherwise dominated by fur and leather.[24] Scientific analyses offer huge possibilities and further research on this cemetery

[24] Pankova and Mikolaychuk 2020.

[25] Thereafter no further attempt was made to market our intellectual property and elements of the design and curatorial concept were put into the public domain through online posting and publication: Simpson 2012.

Figure 17. A family on a community preview realises that this reconstructed log cabin is an original tomb (photograph: Benedict Johnson)

Figure 18. The exhibition shop (photograph: Benedict Johnson)

the public, attracting 122,823 visitors and record sales in the exhibition shop, 15% higher than projected, with literally all stock sold by the closing weekend (Figure 18). The exhibition received unprecedented 5* press reviews,[26] attracted an average live viewing audience of over 10,000 people per half-hour broadcast on Youtube Live, and was seen by others as an outstanding example of how major museums can exercise soft power in difficult political times. Unusually, it also attracted reviews in two international peer-reviewed journals.[27] This exhibition was the work of many and special thanks are paid here to everyone who made it this success (Figures 19–22).

Throughout the course of an exhibition such as this, there were many questions are posed by the public. Where was the gold from? Has there been any work done on the DNA of the population? What was the

[26] Adams 2017; anon. 2017; Aspden 2017; Campbell-Johnston 2017; Frankopan 2017; Hudson 2017; Januszczak 2017; Jones 2017; Kennedy 2017; Luke 2017; Maitlan 2017; Mount 2017; Pickford 2017; Richardson 2017; Sooke 2017; Whitworth 2017.

[27] Johnson 2018; Pankova 2020*a*; a full report was also made on the making of the exhibition which contained the key findings from the formative and summative evaluations, as well as the label and panel copy and summaries of public programme and other events: Leighton and Simpson 2018.

Figure 19. Curators and conservators from the State Hermitage, National Museum of Kazakhstan and the British Museum gather on the museum front steps during de-installation

questioned the species identification of the stuffed felt 'swan' from Pazyryk kurgan 5.[28] They instead suggested that it represented either a conflation of species attributes, a White Pelican (*Pelecanus onocrotalus*), which is found around the northern Black Sea,[29] or, more likely, a migratory red-crowned crane (*Grus japonensis*) as the local Bewick swans have yellow beaks and white wing feathers.[30] It is easy to imagine how the choice of a crane would have resonated strongly with nomads who themselves followed a seasonal pattern of movement and had brought the embalmed body of the deceased on this cart for interment in a seasonall place of burial. Another individual suggested that a pair of bone chopsticks from Il'movaya Pad' in Transbaikal were actually hair pins worn in Chinese style, and went on to suggest that the accompanying burial was most likely a woman with hair piled high on her head.[31] Musicologists questioned the identification of a carved bone item from Aymyrlyg as a 'Jew's harp' idiophone on the grounds that the central portion was too fragile and that the holes at either end suggested instead it may have been a decorative item stitched onto cloth.[32] Some of

Figure 20. Curators and conservators from the State Hermitage and the British Museum pause briefly during condition checking (photograph: Chloe Leighton)

status of women? Is there any evidence for gaming? What evidence is there for music? What language did the Scythians speak? What were their horses like? Occasionally, interesting and compelling suggestions were offered which differed from those published in the catalogue or written on the labels. Several birders

[28] Simpson and Pankova eds 2017: 252, cat. 174, following the suggestion of the excavator (Rudenko 1970: 192, pl. 166).
[29] Peter Ryley, pers. comm., 8th January 2018.
[30] Michael Banks, pers. comm., 18th October 2017, 6th January 2018; A. Naylor, 4th November 2017.
[31] Cf. Simpson and Pankova eds 2017: 336, cat. 247.
[32] Cf. Simpson and Pankova eds 2017: 340, cat. 257.

Figure 21. Installing objects requires teamwork as well as good design (photograph: Chloe Leighton)

Figure 22. Pinning gold lion appliqués onto a display panel takes time, skill and patience (photograph: Chloe Leighton)

these, as well as other points and suggestions, we could answer personally or through lectures, exhibition tours, social media, press interviews and popular articles.[33] Others must await publication or further research but, from the outset we insisted that a major conference be part of the public programme and, we are delighted that this was fully endorsed by both museums.

The papers which follow reflect the high level of interest: there are 45 papers by 58 contributors and co-authors from 16 countries and at different stages of their careers (Figures 23–24). The call for papers was open to all and attracted a very positive response. Sadly, some individuals were unable to participate, either because of difficulties in obtaining UK visas in time or through personal, health or other reasons, but we are delighted that almost everyone, including these individuals, were able to offer their presentations for publication. This has been a long process: most had to be translated and edited, peer reviewed, repeatedly checked against the cumulative bibliography which we felt appropriate in this case, and in some cases picture rights clearance took longer than expected. We are now pleased to offer the results, highlight some of the key approaches below, and conclude this volume with a discussion of some of the key points arising.

The contributors to this volume take a wide range of approaches to the questions they ask. Many are archaeologists, some historians, others are curators or

[33] Long popular articles were published in five specialist archaeology and museum magazines, each offering scope to give a different angle on the historical and archaeological sources: they were the *BBC World History Magazine* (October/November 2017), *British Museum Magazine* (autumn 2017), *British Archaeology* (November/December 2017), *Current World Archaeology* (August/September 2017) and *Minerva* (September/October 2017).

Figure 23. Some of the participants at the conference gather for a group photograph

Figure 24. The conference encompassed archaeologists and curators from many countries: this group includes participants from Russia, Ukraine, Kazakhstan and Britain

archaeological scientists; some interpret the physical appearance of objects to suggest how they might have been made, others employ replication to test these questions and show how bows and beads were made or decorated. Most are actively working in the field, from Moldova, Romania and Ukraine in the west to southern Siberia, Kazakhstan and Mongolia in the east, and the results of their excavations, both old and new, are included here.[34] Some also re-analyse old collections in museums or extract new results from old data, whether through provenance study of Pontic Scythian gold clothing appliqués from 19th century collections, or dye analysis of late 9th or early 8th century BC textiles excavated between 1971 and 1974 at the famous site of Arzhan-1 in the Tuva region of southern Siberia. A so-called 'traceological' approach was taken by other contributors to suggest how certain metal objects were made; replication, accompanied by scientific analyses, was undertaken by another in an attempt to understand how a particular type of bleached decoration was created on carnelian beads found at Scythian and later sites. Archaeological science is a fundamental tool in the exploration of the past: there are papers with new analyses of gold from the Siberian Collection of Peter the Great, leather quivers and woven textiles. Others take an anthropological or historiographic approach to reflect on the possible socio-political meaning

[34] Two additional papers on the results of new investigations in Mongolia and China were delivered at the conference but sadly not submitted for publication.

behind chronological developments in 'Animal Style' art or the significance of the whip in Herodotus and the Avesta. Finally, as this conference deliberately aimed to look at periods and cultures beyond that contained within the exhibition, we have one paper examining the ethnographic perspective on traditional nomad economies, another on the dramatic effect the Hephthalite Huns had on the Sasanian and Gupta empires in Late Antiquity, and a third examining the visual impact of Scythian discoveries on 19th century European decorative arts.

These papers throw completely new light on many aspects of Eurasian nomad life but also raise many questions: the concluding part of this volume therefore attempts to set these new results within a broader research context illustrate their relevance to a wider understanding of the history, archaeology and social anthropology of the ancient nomads of Eurasia. This is a fertile field, and one with a very long and equally active area of archaeological research: this collection of papers offers a taste of what is known and the range of approaches being taken now.

The Sasanian and Gupta empires and their struggle against the Huns

Hans T. Bakker[1]

Abstract

Around the middle of the 4th century Hunnic peoples, referred to by the Roman historian Ammianus Marcellinus as 'Chionitae', were settling in the eastern parts of the Sasanian empire in the region known as Tocharistan and Bactria. Soon thereafter they crossed the Hindu Kush and occupied the area around Kabul. A gold coin of king Kidara found in the Tepe Maranjan hoard (Kabul) indicates that the rule of this Hunnic king and the spread of his power to the south of the Hindu Kush must have taken place well before AD 388. In the wake of these so-called 'Kidarite Huns', another Hunnic people – whose name appears as 'Alchon' on their coinage – moved further eastwards and settled in Gandhāra and the Panjab, present-day Pakistan. These nomadic invaders from the central Asian steppes evolved into a formidable threat to both the Sasanian and Gupta empires during the period AD 430–450, a development which has a remarkable parallel in the encroachment of Attila and his Huns upon the Roman empire. In this paper I will try to give coherence to the historic developments in Iran and India at this period. In the second half of the 5th century the Kidarites in the Iranian realm were superseded by yet another Hunnic people who are known as the Hephthalites. Their expansion facilitated the Alchons in the Indian realm to invade the subcontinent under their king Toramāṇa and establish their rule in northern and western India. To this period belongs an important artefact in the collection of the British Museum: the famous silver bowl from the Swat valley. It shows four Hunnic princes on a hunting party. Although this bowl has been the subject of several studies, it has gone largely unnoticed that it contains a brief inscription and a new reading of this is proposed here.

Keywords: Sasanian; Gupta; Huns; Swat valley; inscribed silver bowl

Introduction

The Allahabad stone pillar inscription of Samudragupta, datable to *c.* AD 370, specifies all major political players of the time, within South Asia itself as well as along the borders of the Gupta empire; in the west: the Sasanians, the later Kushans, and the Scythians or Sakas as they are known in India. Hunnic people are not mentioned since they were not yet in sight.

> 'This lofty pillar, an arm of the earth, is proclaiming, as it were, that Mahārājādhirāja Śrī Samudragupta's glory, by surging up from his conquest of the whole world, has spread over the entire surface of the earth and has reached the point that it can expand freely and happily, going from here to the palace of the king of the gods'.[2]

> '[...] (Samudragupta), whose embrace of the Earth is tightening further as the might of his arm is being served by: 1) the Devaputra king (*ṣāhi*), 2) the king of kings (*ṣāhānuṣāhi*), and 3) the Lord (*muruṇḍa*) of the Śakas, as well as by all those who are living on islands such as the people of Siṃhala; (this service is offered) by such means as surrendering themselves, sending gifts of maidens and soliciting his charters, sealed by the Garuḍa emblem, for the (right of) enjoying their districts. Samudragupta is (thus) without serious rival on earth'.[3]

Candidates for the Daivaputraṣāhi are the late Kushan kings of Gandhāra: Vasudeva II or Kipunadha, and regarding the Śaka-muruṇḍa I follow Konow and Lüders, who argue that this 'passage in the Allahabad inscription of Samudragupta ... leaves no doubt that *muruṇḍa* (i.e. 'commander'), originally was a title used by Saka princes'.[4] The *ṣāhānuṣāhi* refers to the 'king of kings' Shāpur II, who around 350, according to the Roman historian Ammianus Marcellinus, was the first Sasanian king to be confronted by an invasion of nomadic people from the Eurasian steppe, referred to by Ammianus as 'Chionitæ'. These so-called 'Chionites' are no other than the 'Hyōn' of Pahlavi sources,[5] that means 'Huns', enemies whom were pacified by Shāpur

[1] The British Museum (ERC Project), London / Gonda Professor of Sanskrit and the History of Hinduism and Indian Philosophy, Faculty of Theology and Religious Studies Emeritus, Oude Boteringestraat 38, 9712 Groningen, The Netherlands.

[2] Allahabad Stone Pillar Inscription of Samudragupta ll. 29–30: *[...] śrīsamudraguptasya sarvapṛthivīvijayajanitodayavyāptanikhilāvanitalāṃ kīrttim itas tridaśapatibhavanagamanāvāptalaḍitasukhavicaraṇām ācakṣāṇa iva bhuvo bāhur ayam ucchritaḥ stambhaḥ* (Fleet ed. 1888: 8 f.; Sircar 1942: 267).

[3] Allahabad Stone Pillar Inscription of Samudragupta ll. 23–24: [...] *daivaputraṣāhi-ṣāhānuṣāhi-śakamuruṇḍaiḥ. saiṃhalakādibhiś ca-sarvadvīpavāsibhir ātmanivedana-kanyopāyanadāna-garutmadaṅkasvaviṣayabhuktiśāsana[y]ācanādy-upāyasevākṛtabāhuvīryaprasaradharaṇibandhasya, pṛthivyām apratirathasya* [...] (Fleet ed. 1888: 8; Sircar 1942: 266).

[4] Lüders 1961: 96; see Bailey 1985*a*: 33.

[5] *Zand ī Wahman Yasn* 4.58 (Cereti 1995); see Cereti 2010: 63 f.; La Vaissière 2015: 183; Payne 2015: 289 f.

and who, under their king Grumbates (Gurambad), helped him to conquer the Roman border town of Amida in 359.[6] Consequently, there is firm evidence that a Hunnic people or peoples were settling in the eastern part of the Sasanian kingdom by the middle of the 4th century. We will begin with these historic developments in Iran.

Iran's way

The Kidara

Following Joe Cribb's detailed numismatic analysis, we have to identify these 'Chionite Huns' with the Hunnic people that came to dominate Bactria (Tocharistan) in the 4th century.[7] Their first coins were issued from Balkh (Βαχλο) by a king whose name reads 'Varahran' [Bahram]. He may either still have been a Kushano-Sasanian overlord, or a representative of these newly arrived Huns, who numismatists call 'Kidarites' after the king that succeeded Bahram and whose coins are marked by the name 'Kidara' and a distinctive *tamga*.[8] A gold coin of king Kidara (Figure 1) found in the Tepe Maranjan hoard (Kabul) indicates that the rule of this king had spread to the south of the Hindu Kush well before AD 388.[9]

The introduction of a specific *tamga*, first on the later Bahram and then on the Kidara coins in Bactria, marks the transition in the second half of the 4th century of Kushano-Sasanian rule to a new regional power. This new power, known to the Byzantine historian Priscus as 'Ούννοι Κιδαρίται',[10] are known to the Chinese chronicle *Beishi/Weishu* as 'Da Yuezhi' (Great Yuezhi), due to conflation with Han-period references to the Kushans.[11] King 'Jiduoluo' of the Chinese chronicles may be this king Kidara.[12]

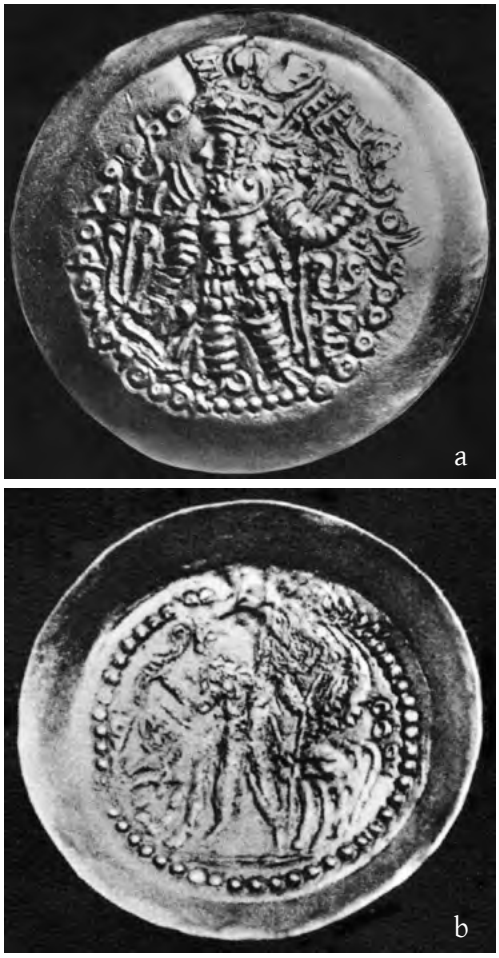

Figure 1. Scyphate gold coin of king Kidara from Tepe Maranjan. 7.35 g, 36 mm. National Museum of Afghanistan, Kabul, present whereabouts unknown (photograph courtesy Joe Cribb)

Writing in the second half of the 5th century, the Armenian historian Faustus of Byzantium describes how a 'Kushan king' of Balkh pressed and defeated the Sasanian Shāpur II between AD 369 and 375,[13] and this so-called 'Kushan king' may have been the Hunnic king Kidara.[14] The continuing use by Kidara and his successors of the title 'Kushan-shah' caused this confusion in Chinese and Armenian sources, as it does in modern secondary literature, but there can be no doubt that we have to do with new invaders from the northern steppes: the Huns.

[6] Ammianus Marcellinus, *History* 19.1.7 ff.

[7] Cribb 2010.

[8] Cribb 2010: 99, 111; as surmised by Cribb (1999) and Sims-Williams (1999), this Varahran of the Kushano-Sasanian/Kidarite coin types may be identified with a 'Kushan Shah' mentioned in an undated Bactrian letter (Bactrian Documents II (p. 52 f.): **ba**1): ... οαραραυο στοργο χοϸαυοϸαο ... '[from] Warahran the great Kushan-shah'

[9] Errington 2017: 69; Cribb 2010: 93, 99, 126 (fig. 13). The legend of this coin is read by Cribb as: βαγο Κι(δαρο) οοζο[ρ]κο κοϸανοϸαο ('Lord Kidara, the Great Kushan Shah').

[10] Priscus: fr. 33.1: 'Since the monarch [Yazdagird II] of the Parthians [i.e. Sasanians] was involved in a war with the so-called Kidarite Huns, he ejected the Lazi who were fleeing to him' (Blockley 1981/83: vol. II, 336 f.; vol. I, 54 f., dating this fragment to AD 456; see also *ibid.* fr. 41.1, 41.3, 47, 51 (Blockley 1981/83: vol. II, 346, 348, 354, 360; Cribb 2010: 91).

[11] Cribb 2010: 91.

[12] *Weishu* 102.8*b*: 'Their [i.e. larger (group of) Yuezhi (Falk)] king Chi-to-lo [Jiduoluo], who was brave and warlike, thereupon [i.e. after moving west and establishing the capital at Po-lo/Balk (Falk)] raised an army, crossed the great mountains and, going southwards, invaded northern India (T'ien-chu). The five kingdoms north of Ch'ien-t'o-lo [Qiantuoluo] (= Gandhāra) became all subject to him' (quoted from Falk 2015: 135 (*Kushan Histories* §128). Although the topography involved is disputed, most scholars agree upon the identification of Chi-to-lo (Jiduoluo) with Kidara (see Balogh (ed.) 2020: 26).

[13] Garsoïan 1989.

[14] Cribb 2010: 93. P'awstos Buzand, *Buzandaran Patmut'iwnk'*: 'For at that time, the Sasanian king of Persia had been waging war against the great Aršakuni king of the K'ušan, who held the city of Bałh [Bałx]. And when the Persians went to war against the K'ušan, the king of Persia sent forth these men whom he had brought captive from Armenia together with his own forces. [...] And when the two contingents clashed together in combat, the Persian army suffered defeat at the hands of the forces of the K'ušan and turned to flight under frightful blows. [The K'ušan] caught up with the Persian army and did not leave a single one from the Persian forces alive; no one survived to bring the news' (Book V, ch. xxxvii (*c.* AD 375), quoted from the translation by Garsoïan (1989: 217 f.); for the events of *c.* AD 369, see Book V, ch. vii (Garsoïan 1989: 197 f.); also Garsoïan 1989: 384, s.v. K'ušan).

We noticed that Kidarite rule had reached the Kabul/Begram area south of the Hindu Kush before AD 388. About this time later Kushan-style gold coins inscribed with the name 'Kidara' make their appearance also in Gandhāra, present-day Pakistan. On these coins the name Kidara is associated with either 'Gadahara' [Gandhāra] or Kuṣāṇa. They testify to Kidarite rule in Gandhāra, not to the rule there of the eponymous king himself.[15]

During the first half of the 5th century the Sasanian kings Wahrām V (420–38) and Yazdagird II (438–57) remained engaged in the ongoing conflict in order to drive the Huns out of Bactria, with the unwelcome result, however, that the Sasanians ended up being tributary to the Kidarite king (see below). Evidently the Kidarite Huns had established a powerful kingdom on both sides of the Amu darya (Oxus river), in Bactria and Sogdiana, as the three sealings of king Uglarg/Ularg may prove.

> '... lord Uglarg(?), the king of/over the Huns, the great Kushān-[shāh], the *afshiyan* of [Samar]kand'.[16]

King Uglarg, *afshiyan* of Samarkand, is depicted with a Sasanian-style crown and curls on each shoulder in Sasanian fashion. We have noted that the title 'Kushān-shāh' does not necessarily indicate a Kushano-Sasanian ruler, but was adopted by the Kidarite successors. Nevertheless, the legend represents an anomaly. Apart from a spurious clay sealing said to have been recovered in Kauśāmbī, and allegedly reading '*hūṇarāja*',[17] we do not, to the best of my knowledge, possess documents, whether

Figure 2. Sealing of Lord Uglarg. AA 2.2 (Hc009). 68 x 70 x 43 mm. Aman ur-Rahman Collection (photograph courtesy *Das Anlitz des Fremden*)

inscriptions, seals or coins, in which a Hunnic ruler calls himself 'Hun' or 'king of the Huns', as apparently is the case in these three sealings of the ruler of Samarkand. Sources in which the name 'Hun' and its linguistic variants occur belong, generally speaking, to their adversaries and the word therefore may have a pejorative meaning, as had the Chinese phrase from which the word ultimately may have derived: *xiōngnú*: 'savage slaves'.[18]

Notwithstanding this anomaly, these three sealings in combination with Kidarite coinage evince that a Hunnic people, who identified with the Kushano-Sasanian rulers, claimed sovereignty over the former Kushan empire on both sides of the Oxus and in Gandhāra in the first half of the 5th century.

Synchronisms

The evolving power of Hunnic people in eastern Iran (Kidarite) and northwest India (Kidarite/Alchon) during the period 430 to 450 has a remarkable parallel in the expansion of Hunnic forces under Attila encroaching upon the Roman empire. Three empires – Roman, Sasanian, Gupta – were weighed down under the ravages of war and the levies exacted by their elusive enemies. All three made strenuous efforts to turn the tables in the sixth decade of the 5th century.

During this time, Attila was held off at the Catalaunian plains in northern France in AD 451 and died in the

[15] This seems to be confirmed by the Chinese *Book of Wei [Weishu]*, which refers to a branch of Kidarites, the 'Lesser Yuezhi', who are said to have their capital in Fu-lou-sha (Puruṣapura = Peshawar) under Kidara's son. *Weishu* 102.10: 'The country of the lesser Yüeh-chih [Lesser Yuezhi] has its capital at the city of Fu-lou-sha. Their king was originally a son of the Great Yüeh-chih [Great Yuezhi] king Chi-to-lo [Jiduoluo]. When Chi-to-lo had moved westwards under pressure of the Hsiung-nu [Xiongnu], he ordered his son to hold this city; hence they are called the 'Lesser Yüeh-chih' [Xiao Yuezhi]. (Their capital) lies southwest of Po-lu [Bolu], at a distance of 15,600 miles [the Beishi text has 16,600 *li* (Falk)] from Tai [Dai]. [...]. As to their customs, they have money made of gold and silver [...]' (quoted from Falk 2015: 135 f. (*Kushan Histories* § 129); see Balogh ed. 2020 I.015. Po-lu (Bolu/Bolule) seems here to refer to Balaam/Balkh (Balogh ed. 2020: 28). The `state of Bolu' is believed to correspond to Bolor, the Valley of Gilgit in Pakistani Kashmir (Chavannes 1903: 406).

[16] Lerner and Sims-Williams 2011: 36, Type AA2 (pp. 72–74): '[...]ο βαγο ογλαρ(γ)ο – υονανο β(α)ο οα(ζ)αρκο χο(βανορ) [αο σαμαρ] /– κανδο – αφβιιανο'. Sealing AA2.3 (Hc158) reads 'ολαργο'. This sealing is said to have been found in 'an area known as Sakra, above the village of Pirsai in the Kashmir Smast Range' (Aman ur Rahman *et al.* 2006: 125), or 'in Swāt' (Grenet 2010: 272).

[17] *Indian Archaeology – A Review [IAR]* 1954/55: 18, pl. XXXII.B; Thaplyal 1972: 61; Melzer 2006: 260, n. 59. Unfortunately, the photograph published in *IAR* of this impression is completely unreadable. It does not represent a sealing in the usual sense, since the clay contains a series of four small similar impressions. Serious doubts about this artefact and its interpretation are in place.

[18] The contention of La Vaissière 2015 to the effect that 'the Huns kept their name as a political reference point' (p. 176), that 'the Huns of Europe [...] used this name [i.e. 'Hun'] to refer to themselves' (p. 180), and that the Xiongnu/Huns north of the Altai 'called themselves Xiongnu/Huns' (p. 190) remains open to doubt, as long as no textual evidence is advanced in its support. The origin of the word 'Hun' in all its linguistic variants is an intricate question in which I do not feel entitled to judge (see most recently Atwood 2012: 29 ff.).

arms of his young bride in 453.[19] In the meantime the Sasanian king Yazdagird II had been engaged in an inconclusive war with Kidarite Huns nearly all his life,[20] but his last great military offensive, in the 16th year of his reign (AD 453), ended fatally for the Sasanians according to the Armenian historians Ełishē and Łazar P'arpets'i,[21] since its result seems to have been that Yazdagird ended up tributary to the Kidarites.[22] Finally, the Gupta prince Skandagupta, involved in a succession war,[23] fought adversaries called 'Hūṇas' in his *Bhitari Stone Pillar Inscription* of 455.[24] The political situation in the northwest of the Subcontinent makes it likely that this Hūṇa enemy was a confederacy of Kidarites and Alchons: we will deal with this confederacy below.

The question may be raised: did Yazdagird and Skandagupta get wind of Attila's failure and death and did they coordinate their attacks on the Kidarites on both sides of the Hindu Kush in 453–55? The simultaneous wars in the 450s against various Hunnic peoples brought some relief to the imperiled empires. After Attila's death Hunnic power in the West quickly disintegrated.[25] Pērōz, who succeeded Yazdagird II in AD 457,[26] refused to honour the tributary obligations contracted by his father Yazdagird. He is reported by Priscus to have even conquered Balkh in 467.[27] Skandagupta's campaign against the Hūṇas must also have been quite effective, since we do not hear of them again in Sanskrit sources during his reign. However, unlike in the west, this relief was short-lived in the case of the Sasanian and Gupta empires. Pērōz's victory over the Kidarites and conquest of their capital Balkh turned out to be a Pyrrhic victory.

[19] Stickler 2007: 94–100. Priscus as reported in Jordanes' *Getica* (Blockley 1983 II: 316–19).

[20] Priscus: fr. 33.1 (see above, n. 10). The Armenian historian Ełishē in his *History of Vardan and the Armenian War* describes the war between AD 442 and 449 (Thomson 1982: 66); see Thomson 1982: 72, 100 f.

[21] Thomson 1982: 192 f. (Ełishē); see Thomson 1982: 302 (Łazar P'arpets'i); see appendix.

[22] Priscus: fr. 41.3 (Blockley 1983 II: 348 f., n. 163).

[23] Bakker 2006: 172–81.

[24] Fleet ed. 1888: 55; Bakker 2005: 249–51; 2006: 178 f.; 2014: 25 f.

[25] Stickler 2007: 101–106.

[26] Sims-Williams and de Blois 2018: 10.

[27] Priscus, fr. 51: 'When the Romans had replied that they would send help and a man to command it, an embassy arrived from the Persians which announced that they had crushed the Kidarite Huns and had taken their city of Balaam' (Blockley 1983 II: 360 f.; see Josua § 10: 'Mit der Hilfe des Geldes, das er von den Römern erhalten hatte, unterwarf Perozes die Hunnen, nahm viele Orte von ihrem Land ein und gliederte sie seinem Reich an' (Luther 1997: 39); Payne 2015: 285; La Vaissière 2015: 184: 'While some numismatists would like to place them [the Kidarites] in the 370s [i.e. Joe Cribb], it is very clear from the combination of the Chinese and classical sources that the Kidarites were the dominant nomadic dynasty in Central Asia from the 420s to the 470s'. I agree with Cribb that a Hunnic people who used the name 'Kidara' on its coins was already the dominant power among the peoples who migrated into central Asia from the middle of the 4th century onwards. Apparently there came an end to their hegemony with the fall of the capital Balkh in 467.

The replacement of the Kidarites by the Hephthalites

A decisive role in the further developments was played by another Hunnic people, who called itself Ηβοδαλο, Hephthal, and who replaced the Kidarites in Bactria after the defeat of the latter. A campaign of Pērōz against these Hephthalites led to his capture, from which the 'king of kings' only escaped after having been ransomed by the Roman emperor Zeno (AD 474–491).[28] The headstrong Pērōz was unable to digest this humiliation.[29] His final campaign against the Hephthalites ended in a total disaster. AD 484 was a momentous year by all accounts. Pērōz and his army were annihilated by the Hephthalites under their king Xašnawāz, a calamity of such proportions that it has been reported in nearly all historical sources: Greek, Armenian, Syriac, Pahlavi and Arabic.[30] The Hephthalite Huns, called 'White Huns' by the Byzantine historian Procopius,[31] had obviously grown into a formidable military force north of the Hindu Kush and the Sasanian kingdom had hit rock bottom.

Pērōz's defeat led to a period of great social unrest in the Sasanian kingdom during the reign of his son Kawād, who succeeded him in 488 after a succession war and who, initially at least, tolerated (or used) the socio-religious movement of Mazdak, a revolutionary movement that seriously undermined the Sasanian administration by challenging the Iranian nobility and Zoroastrian orthodoxy.[32] In a seizure of power by the Iranian nobility Kawād was dethroned in 496 and confined to the 'prison of oblivion', from which, however, he managed to escape.[33] With the help of the Hephthalite king, Kawād reconquered the Sasanian throne in *c.* 498. From then on, for keeping himself in power, Kawād was dependent on the Hephthalites, with whose royal house the 'king of kings' had family ties.[34] In 502 Kawād felt strong enough to rekindle the war

[28] See Luther 1997: 120. Josua § 10: 'Schließlich aber wurde er [Pērōz] von ihnen [i.e. the Huns] gefangengenommen. Als [dies] der römische Kaiser Zeno hörte, sandte er aus eigenen Mitteln Geld, rettete ihn und versöhnte ihn mitt ihnen. Perozes aber schloß einen Vertrag mit den Hunnen, daß er nicht wieder die Grenze ihres Landes überqueren werde, um Krieg gegen sie zu führen. Er kehrte jedoch um und hinterging seinen Vertrag gleichwie Zedekia'. Luther 1997: 39f.; for Zedekiah see: II Kings 24,18–25, 7 and II Chronicles 36,11–13. See Procopius 1.3.8–22.

[29] Procopius 1.4.1.

[30] Procopius 1.4.2–16; cf. Łazar P'arpets'I § 154 (Balogh ed. 2020 VI.004/E); Sebeos § 8; Josua § 11 (Luther 1997: 40); *Bundahišn* 33.17–18 (Cereti 2010: 69 f.). In the Pahlavi source the Hephthalite king is called 'Xašnawāz'; in al-Tabarī I: 876 (Bosworth 1999: 115 f.), his name is 'Akhshunwār'. Widengren, quoted by Bosworth (1999: 114), suggests that his 'name' represents the Sogdian title *'χšw'nw'r*, 'power bearer', i.e. 'king'.

[31] Procopius 1.3.1.

[32] De Blois 2012: 18; for a general overview see Daryaee 2009: 26–28, 86–91; see also Howard-Johnston's *Historical Background* in Sebeos I: xvi; Widengren 1965: 308–10; Luther 1997: 137–41, 148; de Blois 2012 (against Crone 1991).

[33] Procopius 1.5.1–9, 1.6.1–10.

[34] Procopius 1.6.10–19; Josua § 24 (Luther 1997: 46 f.); for a historic evaluation of this episode see Luther 1997: 149 f.

with the eastern Roman empire, which turned out to be another costly miscalculation.[35] This fateful period in Sasanian history lasted until king Khusraw (531–79) was able to set things right, had Mazdak executed in 531, and concluded the 'endless peace' with emperor Justinian in AD 532.[36] The weakness of the Sasanian empire, beginning with Pērōz's defeat in 484 and ending with the restoration led by his son Khusraw I in 531/32, had its counterpart in a Hunnic kingdom in Bactria and Sogdiana at the height of its power.

The political and military situation north of the Hindu Kush had a profound effect on the strike power of the Hunnic warlords to the south of the Kush, in Gandhāra and the Panjab. It is exactly during this period of half a century that the Alchon kings Toramāṇa and his son Mihirakula were able to control large parts of western and northern India.[37] And it is no coincidence, I think, that, as soon as Khusraw had established his authority and showed successes against the Hephthalites, the Alchon Huns in India failed to maintain grip on the country. It made that Mihirakula and the Hūṇa leaders after him were unable to recover from the defeat that they had suffered in AD 532 at the hands of Yásodharman, king of Daśapura (Mandasor).[38]

India's way

The Alchon

We have seen that so-called Kidarite Huns had established their power south of the Hindu Kush before AD 388. Numismatic evidence testifies to another group, associated with these Kidarites or a branch thereof, which gradually came to replace the Kidarite rulers in the Kabul area, Gandhāra and the Panjab. They called themselves Αλχανο, Alchon, and distinguished themselves from the Kidarites by a different *tamga* and the pride they took in their elongated skull or 'Turmschädel',[39] which came to replace the Sasanian-type crown on their coins. A drachm of King Khi(ṅ)gila from Gandhāra with a legend in Bactrian and Brāhmī script, 'Alxanano Khigila', may illustrate the point.

The build-up of Alchon military force is obscured by a lack of written sources. Unlike the Iranian world, the Indian one was not monitored by an orbit of historians. Coins and inscriptions are our main sources of information.

Figure 3. Silver coin of the Alchon king Khiṅgila (G44), Gandhāra. 3.54 g, 25.7 mm (Aman ur Rahman Collection; photograph courtesy *Das Anlitz des Fremden*)

It seems that after Skandagupta's campaign had brought defeat to the Hūṇas in Gandhāra and the Panjab in *c.* AD 455, Alchon warlords filled the power vacuum, like the Hephthalites in Bactria after Pērōz's capture of Balkh in 467. There are some indications that these Hephthalites, or Heda/Yeda as they are called in Chinese sources, had a hand in this. The *Luoyang Qielanji [A Record of Buddhist Monasteries in Luoyang]* relates that the Chinese pilgrim Yong Sun entered the country of Gandhāra (Kan-t'olo/ Qiantuoluo) in AD 520 where he reports the following:

> 'Quand il [the country of Gandhāra] eut été vaincu par les Ye-ta (Hephthalites), on y plaça comme roi un *tch'e-k'in* (*tegin*); depuis que (cette dynastie) gouverne ce royaume, deux générations se sont déjà écoulées'.[40]

Yun Song met the third king of this dynasty, who is reported to have been fighting continually for three years with Jibin (Kashmir) over territory. He is generally believed to have been Mihirakula.[41] If this is correct, it would place the first ruler, the '*tegin* installed by the Hephthalites', in the period preceding Mihirakula's father Toramāṇa, that is roughly between Skandagupta's campaign and AD 495. Since the Hephthalites rose to power after the defeat of the Kidaras, the installation of the *tegin* may have taken place in the 460s. The best candidate for this position seems to be Devaṣāhi Khiṅgila.

We should not think of this change in power in absolute terms, but rather as a shift in the balance of power, the ascendency of one group over another. Numismatic

[35] For a summary of this episode see Howard-Johnston 1999 in Sebeos I: xvi.
[36] Procopius 1.22.15–19.
[37] I have dealt with this history in my Gonda Lecture (Bakker 2017), in which I argued that these 50 years of Hunnic hegemony (AD 484–534) had also a great impact on cultural developments in India.
[38] Bakker 2014: 35–40.
[39] This is a widespread phenomenon among the nomads of the steppes: see Maenchen-Helfen 1973: 178; *Das Anlitz des Fremden*.
[40] Chavannes 1903: 416f.; Xuanzang (Beal 1884: xcix f.); Balogh ed. 2020 I.054/B.
[41] Chavannes 1903: 417.

Figure 4. Common coinage of four Alchon kings. a. Lakhana rāja (G79), b. Mehama ṣāhi (G316/1), c. Javukha ṣāhi (G82) (photograph courtesy *Das Anlitz des Fremden*); d. Khingila devaṣāhi (G81): 3.59 g, diam. 28 mm.

evidence pertaining to the second half of the 5th century shows that the Alchons united Gandhāra and the Panjab in a sort of confederation, not unlike the five Yabghus who divided and ruled the land of the Yuezhi above the Amu darya before they were united in the Kuṣāṇa kingdom by Kujula Kadphises in *c.* AD 30.

The Alchon confederacy

The Alchon confederacy consisted of four 'kings', a quadrumvirate that can be deduced from their common coinage ('Gemeinschaftsprägung') as put forward by Matthias Pfisterer (Figure 4).[42]

There are two determinant factors which allowed the Alchon to become powerful in the northwest of the Indian subcontinent and which provided the necessary conditions for the Alchon's military expansion.

Firstly, to the north of the Hindu Kush a strong power had arisen by AD 484: the Hephthalite Huns, to whom the Alchon might have been related. Their alliance gave the Hunnic people in India direct access to the steppes from where their ancestors came, and it supplied them with an unlimited number of men and horses. It provided them, so to speak, with military backup. The other factor that determined the growth of Alchon power in the last two decades of the 5th century was the unstable political situation within Gupta India itself.

In addition to the coins, there are two important sources which document the life and conduct of the Alchon quadrumvirate in Gandhāra and the Panjab before their conquest of India: the silver bowl from Swat, to be compared with a similar bowl found in Chilek, and the Schøyen copper scroll. We begin with the bowls.

Two drinking vessels: the silver bowls from Swat and Chilek

The discovery of the Swat silver bowl was announced to the Society of Antiquaries of London in 1912, when Charles Hercules Read reported that, according to his informant, this vessel (Figure 5) had been recovered when 'during a flood on the Swat river part of the bank was washed away'.[43] Just as the silversmith consulted by Read, O.M. Dalton (then Keeper of the Department of British and Mediaeval Antiquities in the British Museum) thought that the 'bowl may have been cast and chased',[44] and may originally have been gilded. Dalton

[42] Pfisterer 2013: 83–91.

[43] Read 1912: 251.

[44] Read 1912: 251, n. 1; Dalton 1964: 54. Read himself thought that it may have been made by hammering, a technique not excluded by Dalton.

Figure 5. Silver bowl from Swat. BM 1963, 1210.1. 819.3 g, D 15.7 cm, H 5.7 cm, volume 630 ml (photograph courtesy British Museum)

based his iconographic description mainly on Read and concluded that 'Greek influence is inconspicuous', 'Sassanian influence is most prominent', and 'Indian influence is definitely present' – a comparison of the birds decorating the ceiling of Ajanta Cave 1 and the inner ring of the bowl may demonstrate the last point (Figure 6).

Figure 6. Bird decorating the inner ring of the Swat bowl (detail of Fig. 5) and ceiling decoration Ajanta Cave 1

Dalton thus 'conjecturally attributed this vessel to the Kushan [. . .] rulers of Gandhara and the Punjab'.[45] Before we give a further assessment of the Swat bowl, it may be helpful to compare it with a similar silver bowl found at Chilek, not far from Samarkand, until recently in the Museum of History and Culture of Uzbekistan in Samarkand.

The Chilek bowl

This bowl was first published in 1969 by the late Boris Maršak, then head of the Central Asia and Caucasus section in the Oriental Department at the State Hermitage Museum.[46] The bowl is decorated by an 'homme-arcade' of six pointed arches in which the standing figures are found of six women, naked except for a diaphanous *dhotī* and floating ribbons. Two similar figures positioned opposite one another – clockwise one (1) at 1*h*, the other (2) at 7*h* – are each accompanied by two acolytes. Together they form two figurations that are symmetrical but for the attributes in the left hands of the four attendants.[47] The duplicated figures 1 and 2 stand in an elegant, possibly dancing pose, wielding a scarf over their heads, while their faces are turned around 'as if to see [themselves] in a mirror', which, as has been demonstrated by Judith Lerner,[48] is being shown to them by one of the acolytes.[49] The other two attendants hand them each a diadem. The arches rest on six columns which appear to consist merely of foliated decoration, not unlike the pilaster ornamentation of the monumental *iwan* at Taq-e-Bostān (Kermanshah, in western Iran). Capitals of two adorsed zebu cows top the six columns. In each spandrel between the arches is the bust of a winged figure, which lends support to the view that we are here concerned with a scene under the auspices of heaven in regard to a king who is presented in the central medallion.[50] The diadem could be part of

[45] Dalton 1964: 55.
[46] Marshak and Krikis 1969.
[47] Attendant 1.1 (11 o'clock) and attendant 2.2 (9 o'clock) hold horizontal-handled mirrors in their right hands (Lerner 1996: 24), and their left hands hold respectively an eight-petalled flower similar to that held by the figure in the medallion, and a fruit (?). Attendants 1.2 (3 o'clock) and 2.1 (5 o'clock) hold wreaths or diadems in their right hands, and a bell-flower and an eight-petalled flower in their left respectively.
[48] Lerner 1996.
[49] See also Marshak 1986: 31.
[50] It has been proposed by Kamilla Trever, as reported by Gray (1991), to interpret this scene as a divine investiture by a goddess, possibly Anāhitā (Anāhīd): 'K.V. Trever has identified these figures as images

Figure 7. Silver bowl from Chilek. diam. 18.5 cm. c Samarkand, Museum of History and Culture of Uzbekistan. Present whereabout unknown (photograph courtesy Judith Lerner)

Sasanian investiture iconography, but in that case one would expect it to be offered to the king, quod non.[51]

The central figure in the medallion seems to have an elongated skull, which may point to an Alchon prince. He ostentatiously holds the stalk of a eight-petalled flower in his right hand between thumb and forefinger. This depiction may be compared with silver coins (G 62) of the Alchon king Mehama, in which the king (with elongated skull) holds a flower stem between thumb and forefinger of the right hand.[52] The

Figure 8. Medallion, bowl from Chilek and medallion, bowl from Swat

Chilek bowl, and its central medallion in particular, resembles the bowl from Swat, although the central figure of the latter is without limbs and has short curly hair. The resemblances between the two bowls led Frantz Grenet to conclude that: 'It is clear at a glance that it is the product of the same workshop, and its Gandharan origin is confirmed by obvious borrowings from the local style'.[53] I am less certain of this but it is plausible that both bowls come from the courts of Hunnic/Alchon kings of the 5th century south of the Hindu Kush.

The Swat bowl

Advances in the iconographic interpretation of the Swat bowl were made when numismatists took a good look at it. They supported the above, tentative, conclusion regarding its date and provenance by comparing the crowns of the four hunters with those on the coinage of Hunnic kings in Swat and Gandhāra.

Robert Göbl compared the crowns of two of the four hunters with Kidarite coins: one with, the other without *korymbos*. The third hunter, according to Göbl, 'has

of Anahīta and the arcades as niches standing for shrines. However, I [Gray] suggest that the decoration is secular and that these are dancing girls and the arcade to have definite Indian connections' (Gray 1991: 61). I see only two possible 'dancing girls'. A similar arcade with pointed arches is found, for instance, on the Bīmarān reliquary, for which see Rowland (1946), who discusses the (Western) origin and meaning of the (celestial) motif of the 'homme-arcade'. Errington (2017: 106) discusses this reliquary as follows: 'The arcade of arches is understood as a "visual metaphor" for the spiritual world, including either the Trāyatriṃśa heaven of the 33 gods, or the Tuṣita heaven of future Buddhas'.

[51] Marshak 1986: 31: 'Das Sujet der Schüssel aus Tschilek kann als Darstellung eines Festmahls des Königs verstanden werden. ... Die Tänzerinnen beim Festmahl des Königs sind charakteristisch für die Kunst des Mittelalters von Byzanz bis Indien. In den Kultkompositionen haben diese Figuren andere Attribute. Der Kranz in der Hand der Frau ist nicht der gleiche, wie in den Investiturszenen auf sasanidischen Reliefs, er ist vielmehr identisch mit jenen Kränzen, die wir durch Festmahlsszenen auf der Toreutik kennen'. For the mirror I found only one parallel, a silver coin (G 255) in the British Museum collection, described by Göbl as 'Investiturdarstellung'. Göbl 1967: vol. I, 175 f. (Emission 255): 'Der König halt in den sichtbaren 1. Hand zwischen Daumen und Zeigefinger einen Rundspiegel, mit Daumen und Zeigefinger der r. Hand faßt er ostentativ nach den Halskette'. The legend on the obverse reads GDH in Pahlavi script and *ṣā* (= *ṣāhi*) in Brāhmī script. Göbl conjectures Ghazni as the place of finding.

[52] According to Göbl (1967: vol. I, 73), this is a 'Juwel', but this is corrected by Pfisterer (2013: 74 f.). Callieri (2002) discusses various Hunnic seals and coins depicting princes who hold flowers, including the Bactrian seal of Khiṅgila (see below). On the latter seal, the prince holds what has been identified as a pomegranate flower or a wild tulip (Callieri 2002: 128); it is different from the petalled flower held by the prince in the Chilek bowl.

[53] Grenet 2003: 212.

Figure 9. The four hunters of the Swat bowl: detail of Fig. 5 (photograph courtesy Elizabeth Errington)

definitely an elongated skull and of course not 'a pointed cap' as Dalton thought';[54] he adduced early Alchon issues of king Khingila to prove his interpretation.[55] The fourth hunter, who might be the same as the one in the medallion, is without a crown which, according to the Viennese numismatist, was common in early coin issues of Indian Huns, both Kidarite and Alchon.[56]

When it comes to location and time, Göbl attributed the bowl to the Swat valley in the first half of the 5th century,[57] a conclusion not seriously challenged by subsequent numismatists,[58] although later studies tend to date the bowl around the middle of the 5th century and the British Museum website gives a date of AD 460–479. There exists to date a general consensus regarding the iconographic interpretation of the bowl from Swat: it represents a secular scene of a hunt in which princes of two ethnic groups take part. Elizabeth Errington, former curator of South and Central Asian coins at the British Museum, draws an important conclusion from this evidence: 'The bowl reflects a social reality of the period, i.e. one of co-existence between the two groups [Kidarite and Alchon], who may have been in control of different areas at the same period'.[59]

Although the iconography is comparatively well studied, this does not apply to the inscription the bowl contains on both sides of the head of the crown-less hunter (Reiter 4).

As already observed by Read, the 'punched letters on the edge of the bowl were clearly executed after the rest of the work upon it was completed'.[60] Read continues: 'I have thought it best to ask my colleague, Mr John Allan, of the Department of Coins and Medals'. Allan dated the Brāhmī characters between 400–450 AD and reads, according to Read: *khantīṇugaka* or *khambhīṇugaka*, which in Dalton's *Treasure of the Oxus* is spelled with a short *i*.[61] Robert Göbl had his doubts and reads: *...(ṇ)urīka*.[62] We pass over the proposal by Falk to read the inscription as a bi-scriptual monogram of a proper name 'Cegāṇ', since this interpretation has now been given up by the author himself.[63] After a close inspection of the bowl, we may give the decipherment one more try.

[54] Göbl 1967: vol. II, 263 f. (Reiter 3); cf. Dalton 1964: 55.
[55] Göbl 1967: vol. II, 264 (G 41); compare figs 3–4 (G 44, G 81).
[56] Göbl 1967: vol. II, 264 (Reiter 4).
[57] Göbl 1967: vol. II, 264 f.
[58] Errington 2010: 149; *Das Anlitz des Fremden* 2012: case 7; Pfisterer 2013: 42, 44.
[59] Errington 2010: 149.
[60] Read 1912: 256.
[61] Dalton 1964: 54.
[62] Göbl 1967: vol. II, 263.
[63] Falk 2014: 120 f. conjectured, ingeniously as always, a bi-scriptual monogram, one name written twice, in Brāhmī and in Kharoṣṭhī. He proposed to read from the left (Brāhmī) *cegāṇ* or possibly *cigāṇ*, and from the right (Kharoṣṭhī) *chegaṇ*, in which the third character in the middle is a ligature of two scripts: the left part of the Brāhmī *ṇ* annexed to a Kharoṣṭhī *ṇ*. This solution was suggested by the fourth character, which resembles a Kharoṣṭhī *ga* and which was read as such by Allan, silently it seems.

Figure 10. The inscription punched on the Swat bowl.

Figure 11. The upper rim of the bowl is difficult to punch

The uppermost rim of the bowl's frieze, directly underneath the edging, seems to have been difficult to punch for some reason, as a consequence of which the top vowel signs appear truncated. And I seriously doubt whether the character to the right of the face pertains to the name on the left side. It resembles Brāhmī *ka* or maybe, if truncated, *ki*. The triangle of the first character seems too big for a *ca* (Falk) and here I would like to follow Allen's reading *kha*, or if truncated, *khi*. The second character is read by Allen as *nti* or *mbhi*. It is clear that the character is a ligature and I propose to read *ṅga* or truncated *ṅgi*. A comparison with a silver (above, Figure 4) and copper coin of Khiṅgila/Khiṅgi may confirm this reading.

a

b

Figure 12. Legends of silver and copper coins of Khiṅgila (G 81, detail of Fig. 4d) and (G 54: BM 1894, 0507.2006; wgt 0.92 g; photograph courtesy Trustees of The British Museum)

The third and fourth characters were read by Göbl as: *...ṇurī*. The middle (third) character is read by everyone but Falk as a Brāhmī *ṇu*, and the fourth character – the alleged Kharoṣṭhī *ga* (Falk) – could be seen as a somewhat mis-shapen Brāhmī *rī* (Göbl), although this is problematic if we assume that the medial *i mātrās* are truncated. The inscription obviously poses a problem. If we read full or truncated *ki* at the right side of the head, it may signify *kidara*. To the left of the head a name seems to be written, probably of the crown-less owner of the bowl. The first two syllables signify the well-known Alchon name Khiṅgi, frequently on coins as short-hand for Khiṅgila.[64] The second element, '*ṇurī*', remains as yet without significance.

A solution to this conundrum was pointed out to me by Dániel Balogh, who suggested that, instead of reading the third and fourth characters as syllables, we should conceive of them as the Brāhmī sign for 200; the fourth one resembles a slightly truncated 6.[65] The

[64] The element *khiṅgi* is also part of a Bactrian seal legend reading: ϵϸχιγγλο (Callieri 2002: Sims-Williams 2002: 143). The name has been connected by la Vaissière with *kenglu / ching-lu*, 'the sacred sword worshipped by the Xiongnu' (la Vaissière 2007: 129; Maenchen-Helfen 1973: 280). Priscus, in Jordanes' *Getica*, reports how Attila found the 'sword of Mars' (Blockley 1983: vol. II, 280–83). This etymology, however, has been disputed by Nicholas Sims-Williams, who proposes an Indic etymology (Sims-Williams 2002: 144).

[65] Bühler 1896: pl. IX, col. ix (Gupta); Renou and Filliozat 1985: vol. II, 705; Dani 1986*a*: xvii.

most plausible reading of the inscription in my view thus would be: *kh*(*i*) *ṅg*(*i*) 200 6 *ka / ki*. The number 206 may refer to a year in an unspecified era. In view of the stylistic and palaeographic dating of the bowl to the first half of the 5th century, this era could be the Bactrian Era (BE), which started in AD 223, the year of the foundation of the Sasanian empire by Ardashir I.[66] If this is correct, it would give a date to the bowl of AD 428/29.[67] This date would imply that prince Khiṅgi of the bowl with curly hair cannot be the same as the Devaṣāhi Khiṅgila of the common coinage (Figure 4). Khiṅgi(la) was a common name among the Hunnic peoples, like other names known from coins such as Javūkha and Mehama.[68] Discussing these findings with Harry Falk, my learned friend expressed doubt as to the Bactrian Era. Instead he suggested that we should read the last character, not as a Karoṣṭhī *che*, nor as a truncated Brāhmī *ki*, but as *ka* and take it as an abbreviation of *karṣāpaṇa*. The numerals would thus refer to the weight in silver: 206 *ka*(*rṣāpaṇa*). For this interpretation there seems to be a classical parallel, viz. the Taxila silver vase inscription of Jihoṇika: *ka 191*.[69]

The equivalents of Indian weights are notoriously difficult to determine. John Allan reckons with a standard of 1 *karṣāpaṇa* of silver being between 32 to 36 grains (Troy), which is again equivalent to 2.07 to 2.33 gram.[70] This would yield a silver content of the bowl of 426 to 480 g, far short of the weight of the bowl as given on the British Museum website of 819.3 g.[71] The discrepancy may be caused by the use of another *karṣāpaṇa* standard,[72] or by an alloy of tin, or, as suggested by Nicholas Sims-Williams in a personal communication, the figure might refer to the total weight of a pair of bowls of which the Swat bowl is just one. To complicate matters further, I report another suggestion made by Harry Falk, viz. to read the first *akṣara* not as *ce*, as he earlier proposed, nor as *kha* or *khi* as John Allan and I do, but as *va*, which would yield, instead of *khaṅga / khiṅgi*, *vaṅgā*, which may stand for Sanskrit *vaṅga*: 'tin'.[73] Against this interpretation in my view is the fact that the punched inscriptions on silverware usually give the name of the owner and the weight in silver, and ignore the alloy.[74]

In brief, although some progress in the interpretation of the Swat bowl inscription is undeniable, a final reading has to wait for scientific analysis to determine the percentages of silver and tin in the vessel. Until then the meaning of the numerals remains open: a date or a weight, that is the question. What we can say with some confidence, however, is that the British Museum bowl from the Swat valley reinforces our historic view of Hunnic warlords taking possession of northwest India in the first half of the 5th century. The Chilek bowl may exclusively have belonged to an Alchon prince, the Swat bowl testifies to joint hunting parties of the two groups, the Kidara and Alchon, divided over four domains, parties concluded by a drinking bout hosted by one of the princes, Khiṅgi for one, which provided a festive, rowdy occasion of bonding solidarity.[75] The wine that filled the bowl was probably produced in countries under Hunnic control: according to the *Arthaśāstra* it may have been either a Hārahūraka or a Kāpiśāyana.[76]

The Schøyen copper scroll

This unique Sanskrit document, authorized by the Alchons themselves, was acquired by Martin Schøyen in 1996. Since its publication in 2006 the scroll has sparked controversy. Contrary to its editor Gudrun Melzer,[77] Étienne de la Vaissière has argued convincingly that the copper scroll belongs to the Panjab rather than Afghanistan.[78] The scroll refers to four Alchon princes who ruled, it would seem, contemporaneously in northwest India: *mahāṣāhi* Khīṅgīla, *devarāja* Toramāṇa, *mahāṣāhi* Mehama, and *mahārāja* Javūkha, son of Sādavīkha.[79]

There are two things that draw our attention. Firstly, the quadrumvirate is the same as the one reconstructed from the coinage, but for Lakhāna, who is replaced by Toramāṇa, and secondly the titles are somewhat aggrandized in the scroll: instead of *rāja* and *ṣāhi* they are *mahārāja* and *mahāṣāhi*. More important, however,

[66] Sims-Williams and de Blois 2018: 11. Sims-Williams (personal communication) informed me: 'From south of the Hindukush we have one Bactrian document [from Kesh] and one coin type [NumH 240] dated in the BE plus the inscriptions of Tang-i Safedak and the Tochi valley'. The latter inscriptions come from a spot about 185 km southwest of Peshawar and are dated in the Bactrian Era: ITAB (Bactrian) BE 618 (= AD 840/41), ITSB (Bactrian) BE 631 (= AD 853/54) and ITB BE 636 (= AD 858/59). For these inscriptions see Sims-Williams and de Blois 2018: appendix 1 (pp. 88–97). For the document (**Uv**) from Kesh, a spot between Bamiyan and Kabul (BE 504 = AD 726), the coin (NumH 240: BE 480 = AD 702/703), and the Tang-i Safedak inscriptions (BE 492 = AD 714/715), see Sims-Williams and de Blois 2018: 12 f., 15.

[67] Sims-Williams and de Blois 2018: 121, appendix 6.

[68] See Callieri 2002: 129 f. (Khiṅgila); Bakker 2018: n. 19 (Mehama).

[69] Konow 1991: 82. Konow took this as referring to the 'old Saka era', but this view has been dropped in favour of an interpretation that understands it as a reference to the silver weight of the vase. Cribb (1999: 196 f.): 'The inscription is not a date, but a statement of the weight and owner of the jug. It should be translated as follows: "191 ka(rshapanas), of Jihonika, satrap of Chuksa, son of Manigula, brother of the great king"'; see Bopearachchi (2008) for a more guarded view as he observes that the weight of the vase itself is unknown.

[70] Allan 1914: cxxxiv.

[71] See Read 1912: 251; Dalton 1964: 54, 'given by Max Bonn, Esq., 1912': 26 oz. 190 gr. Troy.

[72] A Greek text from Aï Khanoum mentions a money transfer of 10,000 Taxila-kasapana: κασαπανα ταξαηνὰ (Rapin 1992: 98).

[73] Falk, personal communication in an email, 2nd January 2018; Hellwig 2009: 461.

[74] For instance see Falk 2001.

[75] See Gray 1991: 59.

[76] Arthaśāstra 2.25.24–25: *mṛdvīkāraso madhu* ‖ 24 ‖ *tasya svadeśo vyākhyānaṃ kāpiśāyanaṃ hārahūrakam iti* ‖ 25 ‖

[77] Melzer 2006.

[78] La Vaissière 2007; Bakker 2018.

[79] Melzer 2006: 274.

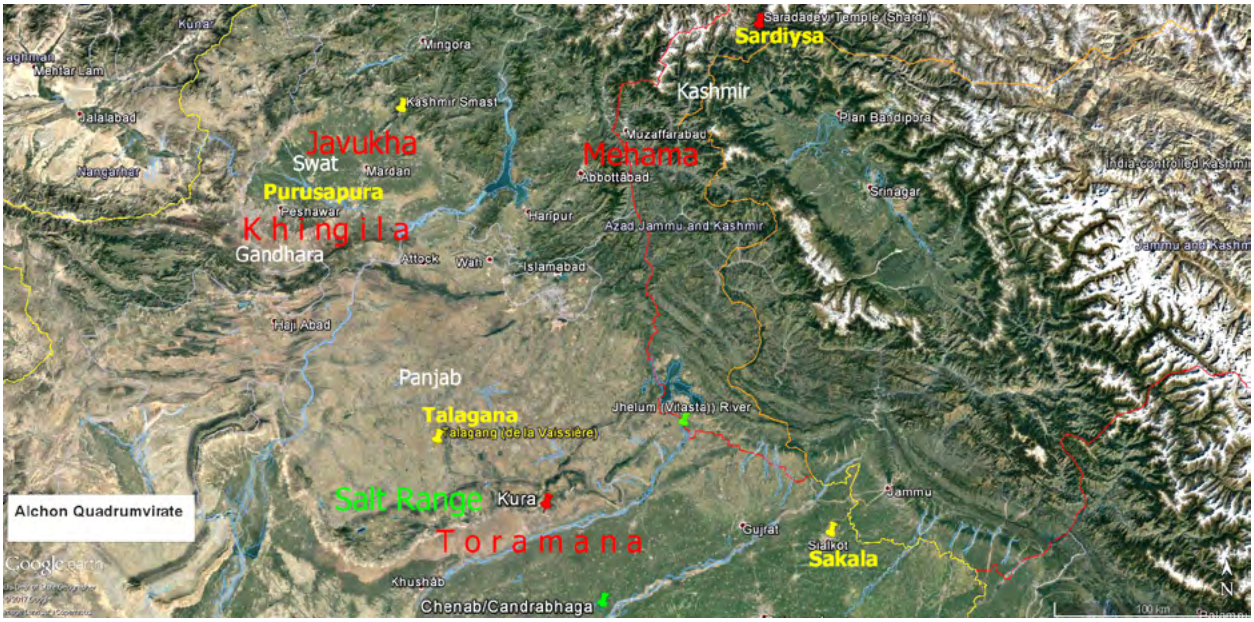

Figure 13. The rule of the Alchon quadrumvirate
(photograph courtesy Google Earth)

is the fact that Toramāna has taken over the Indianised title *devarāja* from Khīṅgīla, who was styled *devaṣāhi* on some of his coins.[80] I think this correspondence is significant as it may express the foremost position of first Khiṅgila/Khīṅgīla and then Toramāna/Toramāṇa. The scroll is dated in Year 68 of an unknown era. If referring to the Kaniska Era, as is most probable, it would correspond to AD 495/96.[81]

Not much later Toramāṇa seized absolute power, which is attested by Toramāṇa's Kurā stone inscription found in the Salt Range (Panjab), an inscription which may be held to be contemporaneous with or slightly later than the scroll on palaeographic grounds.[82] In this record Toramāṇa assumed the Indian royal titles 'Rājādhirāja Mahārāja', combined with the central Asian title of 'Ṣāhi Jaūẖkha'.[83] Evidently, the quadrumvirate – known from the common coinage, the silver bowl, and the copper scroll – had been superseded at the time of the Kurā inscription.

Like the Kurā stone inscription, the Schøyen copper scroll is concerned with a Buddhist foundation. It records the erection of a stūpa. The donor of the stūpa is Devaputra king of Tālagāna, together with his father Opanda and his wife named Buddh..., daughter of the king of Sārada (*sārada-ṣāhi*).[84] In a previous paper I argued that the actual instigator and donor is the first person speaking in the concluding seven *kāvya* stanzas of the inscription and that this person is the princess of Sārada, wife of the king of Tālagāna, Buddh...[85] The donation formula itself also creates the impression that, under the aegis of male authority, represented by the official donor, the Devaputra king of Tālagāna, we are concerned with a pious enterprise set up among three women, viz. 1) the queen of Tālagāna, wife of the donor, 2) the mistress of the mother institution in Tālagāna, the Mahāvihārasvāminī Arccavāmanā, and 3) the beneficiary, Sāsā, mistress of the monastery in Sārada.[86] The stūpa was founded in a place called Śārdīysa,[87] which, I think, was the home town of the princess, and which may be identified with the present-day village of Śārdi in the upper valley of the Neelum river in Kashmir, today best known as the holy place of Śrī Śāradadevī.[88] This area appears to have been under the rule of the Alchon king Mehama, as the last line of the donation formula implies: 'during the reign of Mehama'.[89] It may further be inferred that Toramāṇa and Khīṅgīla were specified in the scroll for reasons of their sovereignty or formal jurisdiction over the donor institution, the monastery said to be directed by the king of Tālagāna in the Panjab.

[80] Göbl 1967: vol. I (Emission 81); Pfisterer 2013: 83 ff.
[81] Melzer 2006: 264. Year 68 leaves, according to Melzer, two possibilities open: if corresponding to the Kaniṣka Era, AD 495/96, or if corresponding with the Laukika Era, AD 492/93.
[82] Melzer 2006: 263; Sircar 1942: vol. I, 422 ff.
[83] Sircar 1942: vol. I, 422; Melzer 2006: 261. See Sims-Williams 2007/12: II, Glossary s.v. ιαβγο (II: 215): ηβοδαλο ιαβγο, 'the *yabghu* of Hephthal'. Chinese *xihou*, Turkish *yabγu*. The addition of Jaūẖkha to his titles may indicate that Toramāṇa saw himself as the founder of a dynasty (Falk 2015: 69, 85).
[84] Melzer 2006: 274.
[85] Bakker 2018.
[86] This is not to say that women could not act as donor on their own account in a Buddhist context. See von Hinüber 2011; Schopen 1997: 250. The size of the donation or foundation and the specific cultural or political circumstances may have been factors determining whether women acted in their own name.
[87] Melzer 2006: 277.
[88] Bakker 2018: 14.
[89] Melzer 2006: 274.

The fourth member of the Alchon confederacy mentioned in the donation formula, Mahārāja Javūkha, does not appear to be directly involved, either in the two Buddhist monasteries, or in their territories. He may have been mentioned because of his membership of the Alchon quadrumvirate. There are indications that Javūkha's territory should be located in the Swat valley.[90] In this way the copper scroll provides an insight into how Hun or Alchon power was organized in the northwest of the subcontinent in the last decade of the 5th century, at the eve of the conquest. Khiṅgila and Toramāṇa ruled as sovereigns in the Gandhāra and Panjab regions, while adjacent territories, such as parts of Kashmir and the Swat Valley, were controlled by other Alchon kings, viz. Mehama and Javūkha. On a lower level, local princes governed as feudatories, among whom apparently were descendants of the Kuṣāṇas, such as the Devaputra king of Tālagāna. The scroll testifies to matrimonial relations between these ruling houses and local centres of power, such as Sārada, the Neelum valley in northwest Kashmir.[91] The scroll also shows that the Alchon rulers were firmly established in Indian culture and were engaged in governing Indian religious institutions, Buddhism in particular.

The conquest of India

This successful establishment within the political and cultural infrastructure of the northwestern region fostered an imperialistic ambition. The buildup of Alchon power in the northwest of the subcontinent after the reign of Skandagupta received a boost, no doubt, when the Sasanian empire suffered its worst defeat in AD 484, in which year Pērōz and his army were destroyed and the Hephthalite Huns consolidated a sovereign kingdom north of the Hindu Kush. However, the year AD 484 not only initiated a period of great instability in Iran, it is also the year which saw a last manifestation of Gupta power in the western division of the empire. At Eran or Airikiṇa, on the southern banks of the Bina river in Madhya Pradesh, the building of another religious complex dedicated to Viṣṇu, the tutelary deity of the Gupta dynasty, had begun in 484. An inscription on the Garuḍa column of Janārdana specifies the circumstances: 'while Budhagupta is king',[92] Budhagupta (476–95) who had succeeded Skandagupta to the imperial throne after an obscure interregnum of circa five years.[93]

The next information that we possess regarding the religious complex in Eran carries as a date the first year of Toramāṇa's conquest. One of the two brothers who had erected the Garuḍa. A column of Janārdana survived the Hunnic onslaught, pledged allegiance to the new ruler, and obtained permission to finish the Vaiṣṇava temple complex by the building of a sanctuary dedicated to Varāha, Viṣṇu's boar incarnation. An inscription on the image of the boar records the new political reality: 'In the first year; while the Mahārājādhirāja, the glorious Toramāṇa, of great fame and of great lustre is governing the earth'.[94] This 'first year' cannot be much later than the Schøyen copper scroll and the Kurā stone inscription in which Toramāṇa used the title *rājādhirāja*. A date around AD 498 seems to be most plausible. Evidently, when the Sasanian empire was in total disarray due to the coup against Kawād in 496 and the latter's return to power in 498, which, as we have noted, left the 'king of kings' entirely at the mercy of the Hephthalites – at this critical juncture Toramāṇa seized his chance, invaded northern and western India, and declared himself emperor.

Conclusion

As we had occasion to remark, Hūṇa power in northwest India lasted as long as it could rely for back-up on its mighty ally on the other side of the Hindu Kush. When the Hephthalites themselves came under heavy pressure of a regenerated Sasanian empire led by Khusraw, and the natural dynamics of the Hunnic people on both side of the Hindu Kush was disrupted, the Indian Hūṇas lost their capacity to recuperate from defeat. It once more shows: the history of the Hūṇas in India was inextricably bound up with the political reality to the north of the Hindu Kush throughout. The Gupta empire, unlike its Iranian counterpart, did not rebound. The main power in northern India of the 6th century came into the hands of the Maukharis in the new capital Kanauj. The Hūṇas around Sialkot in the Panjab remained a fearsome adversary throughout the 6th century, until finally Bāṇa, the famous chronicler of king Harṣavardhana of Kanauj, in a travesty of roles could style the king of Thanesar, Harṣa's father Prabhākaravardhana, 'a lion to the Hūṇa deer'.[95]

Appendix

The Armenian historian Ełishē reports in his *History of Vardan and the Armenian War* (tr. Thomson 1982: 66):

> 'He [king Yazdagird] marched immediately against the kingdom of the Huns, whom they call Kushans; but after fighting for two years he was unable to make any impression on them. Then he dispatched

[90] His 'positive numismatic presence at the Kashmir Smast' (Errington 2010: 153), 31 km northeast of the city of Mardan (Khyber Pakhtunkhwa, Pakistan) and *c.* 28 km south of the Swat valley, intimates that his rule was in and around the Swat valley.

[91] A more detailed treatment is given in Bakker 2018.

[92] Fleet ed. 1888: 89: *bhūpatau ca budhagupte*.

[93] Bakker 2014: 26–29.

[94] Fleet ed. 1888: 159: *varṣe prathame pṛthivīm pṛthukīrtau pṛthudyutau mahārājādhirājaśrītoramāṇe praśāsati*.

[95] Bāṇa, *Harṣacarita* 4: 197: *hūṇahariṇakesarī*; see *Harṣacarita* 5: 250 for Harṣa's elder brother Rājyavardhana's expedition against the Hūṇas in the north: 'as the lion [Prabhākaravardhana], master of the deer, dispatches his cub [Rājyavardhana] against the deer'; Bakker 2014: 74.

> the warriors to each one's place, and summoned to his presence others in their stead with the same equipage. And thus he established the habit from year to year and built there for himself a city to dwell in, beginning from the fourth year of his reign up the eleventh'.

If the years given are correct this passage describes the war between 441/42–448/49. For Yazdagird's further struggle with the Huns (Kushans) in his twelfth year see Thomson 1982: 72 (cf. 100 f.):

> 'Then at the beginning of the twelfth year of his reign [449/50], he [king Yazdagird] gathered a force infinite in multitude and attacked the land of the the T'etals. When the king of the Kushans saw this, unable to oppose him in battle he retreated to the regions of the impregnable desert and lived in hiding with all his troops. But [the Persian king] assailed his provinces, regions, and lands, captured many fortresses and cities, amassed captives, booty, and plunder, and brought them to his own empire'.

The sixteenth year of his reign (AD 453/4) ended fatally for the Sasanians according to the Armenian historians Ełishē and Łazar P'arpets'i (tr. Thomson 1982: 192 f.):

> 'Now in the sixteenth year [453/54] of his reign king [Yazkert] in great wrath again marched to the land of the Kushans to wage war. [...] When the king of the Kushans heard this, he in no way doubted or distrusted the man, nor did the suspicion he might be a spy enter his heart. For he had learned a little earlier, and Bēl as it were confirmed it, that [Yazkert] was marching on the lands of the Kushans; so he immediately made haste to assemble his troops and organize an army to oppose him with force. For although he was unable to face him in pitched battle, nonetheless, falling on his rear he inflicted many losses on the king's army. And he pressed and assailed them so hard that, overcoming them with a small number of troops, he turned them back. In hot pursuit, he plundered many royal provinces, and he himself [the king of the Kushans] returned safely to his own country'.

Cf. Łazar P'arpets'i (tr. Thomson 1982: 302):

> 'In the sixteenth year of his reign King Yazkert set out with his whole host and marched to war against the Kushans. [...] When they [the Persians] arrived at the enemies' [Kushan] borders, not even partially were the king's [Yazdagird's] objectives realized; but completely vanquished, he returned covered in shame, having lost the most elite and eminent men of his army as well as other common soldiers in the cavalry. For the enemy [that is Kushan's] did not fight the Persian army in opposing battle-lines, but unexpectedly falling upon each wing, they put many to the sword, then themselves disappeared again unharmed. Using these tactics for many days, they exhausted the Persian army by their savage attacks'.

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Supersize me: political aspects of monumental tomb building in early steppe empires

Thomas J. Barfield[1]

Abstract

Massive Xiongnu and Scythian kurgan tombs appear surprisingly late in the archeological record. None of the tombs of the early Xiongnu and Scythian rulers have ever been discovered likely because they were deliberately hidden from public view. The late dating of massive kurgan tombs therefore suggests that they were constructed as public monuments to demonstrate political strength at a time when these steppe nomadic polities were experiencing a decline in power. They are also associated with the emergence of class divisions within steppe nomadic societies in which the control of wealth superseded the control of people as the main determinant of elite status. Unlike similar massive tombs in sedentary societies that were invariably premortem building projects designed as the burial place for the ruler who built them, these supersized kurgans were post-mortem monuments built by the heirs of the deceased ruler. They were designed as much to display the personal power of the new rulers who supervised their construction as to honour the deceased rulers buried within them. Sets of massive kurgans soon became symbolic sacred centres whose preservation served as a barometer of a polity's strength or weakness.

Keywords: Steppe nomadic political organization; kurgan tombs, Scythians; Xiongnu

> '"My name is Ozymandias, king of kings:
> Look on my works, ye Mighty, and despair!"
> Nothing beside remains. Round the decay
> Of that colossal wreck, boundless and bare
> The lone and level sands stretch far away'.[2]

Like the works of Ozymandias, the Egyptian pharaoh Ramesses II, the thousands of kurgans of all sizes rising from the steppes of Eurasia are the visible legacy of peoples and rulers now vanished from the lands they once inhabited (Figure 1). While today such eroded monuments might still inspire the poet or cynic to observe that all earthly power and fame is indeed impermanent, the perspective of a person living at the time would likely have been just the opposite. For members of a nomad caravan trudging past a series of huge and well-maintained earth mounds rising high above the flat steppe landscape, such tombs would have been awesome sights/sites in the literal sense. They were evidence of how the powerful could cheat death by inscribing the memory of themselves on the landscape for eternity. For while those entombed are anonymous to us, they were not anonymous when these mounds were erected. In cultures where a person's great deeds and personal glory were preserved in oral traditions of song, poetry, and the heroic tales of their people, such monuments resurrected their memories as effectively as any stone inscription. They would remain eternal as long as there were people to remember them. However, while monumental kurgans were stationary, nomadic pastoral societies were not. They periodically emigrated to other lands, leaving behind these ancestral monuments and the memories they represented. New nomadic groups entering these lands either had no interest in such alien monuments or might seek to damage them in order to erase the memory of those who came before them. As time passed the tombs lost their original cultural reference points and became parts of the natural as well as the human landscape, scattered notes from a formerly impressive musical score that could no longer be understood or played.

The Scythian tradition of erecting kurgan tombs began in southern Siberia in the late 9th or early 8th century BC judging by the excavated remains from Arzhan-1 and then spread westward to the Black Sea steppes by the 7th–6th centuries BC but it only became monumentalised in that region much later in their history. After the collapse of their polity in the middle of the 3rd century BC, large aristocratic kurgans (and even the burials of ordinary nomads) disappeared from the archaeological record.[3] Although often seen as a defining characteristic of the Scythians, the creation of monumental tombs represented something out of the ordinary for a pastoral steppe nomadic society. The amount of concentrated labour needed to build large

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[2] Percy Bysshe Shelley, 1818.

[3] Khazanov 2015: 33.

Figure 1. Monumental Scythian-type burial mounds near Salbyk in Khakassia, southern Siberia (photograph: St J. Simpson 2018)

and permanent structures was not easy to come by in a population which was highly dispersed and regularly on the move to exploit seasonal grasslands. And while the kurgan tomb tradition was quite widespread, such supersized ones were exceptional. Most other steppe nomadic polities chose to bury their rulers in smaller tombs that, while perhaps also rich with grave goods, were less conspicuous and sometimes even deliberately hidden from public view. This paper examines four related political aspects which might help explain why the Scythian elite during this period invested so much, both symbolically and practically, to construct large kurgans:

- the association of royal kurgan tombs with politically centralised nomadic societies and a tradition of aristocratic elites
- the construction of monumental tombs as evidence for a transformation from traditionally accepted but unmarked status distinctions into marked class divisions that focused ever more strongly on the control of wealth rather than the control of people
- massive tombs as post-mortem rather pre-mortem building projects which were designed more to demonstrate the power and legitimacy of a ruler's dynastic successors than the ruler being buried
- the political consequences of erecting monumental royal burial sites as a steppe nomadic polity's symbolic sacred centres which served as a barometer of its strength or weakness.

Such an analysis relies on an anthropological understanding of nomadic societies drawn from ethnographic research, contemporary historical accounts by Herodotus on the Scythians and Sima Qian on the Xiongnu, and archaeological evidence.

Nomads and hierarchy

Social structure

The social organisation of nomadic peoples in most parts of the world is characteristically egalitarian, displaying few internal status distinctions other than age and gender. The Nuer, cattle raising pastoralists in southern Sudan, for example, organised themselves into segmentary lineages of equal status which had no formal internal organisation or leadership.[4] The camel raising bedouin of Arabia had a similar segmentary structure with lineages of equal status but these lineages (and larger combinations of lineages) had permanent sheikhs as leaders. However, these achieved positions which were objects of fierce competition and could be lost if their occupants proved unsuccessful.[5] Far from assuming they could just inherit the right to rule, the sons of such sheikhs engaged in risky behaviour such as camel raiding to establish their own personal reputations, one consequence of which was that sheikhs' sons experienced a much higher death rate than other young men.[6] The 14th century Arab social historian ibn Khaldun believed that cultures

[4] Evans-Pritchard 1940.
[5] Musil 1928: 501–10.
[6] Lancaster 1981: 141.

with such egalitarian social structures produced open but unstable traditions of leadership.[7] If the successors of a powerful dynastic founder mismanaged the state they had inherited, rivals from either inside the group or completely outside it would seek to displace them and would be considered just as legitimate if they succeeded. For this reason even successful dynasties in the Near East and North Africa rarely lasted more than three or four generations. These systems also had another structural weakness: groups and individuals were loath to submit themselves to the authority of those they considered their equals. Ibn Khaldun suggested that this was the reason religious movements played such a large political role in this region:

> 'Bedouins can acquire royal authority only by making use of religious coloring, such as prophethood or sainthood, or some great religious event in general. The reason is because of their savagery, the Bedouins are the least willing of all nations to subordinate themselves to each other, as they are rude, proud, ambitious and eager to be leaders ... Their individual aspirations rarely coincide. But when there is religion (among them) through prophethood or sainthood, then they have some restraining influence upon themselves. The qualities of haughtiness and jealousy leave them. It is easy then to unite (as a social organization) ... This is illustrated by the Arab dynasty of Islam. Religion cemented their leadership with religious law and its ordinances, which, explicitly and implicitly, are concerned with what is good for civilisation'.[8]

In contrast to their Near Eastern nomad neighbours, Eurasian steppe nomadic societies had hierarchical social structures.[9] While their descent groups were ranked primarily on the basis of genealogical seniority, most also distinguished between noble and common clans.[10] Although both of these considered themselves descended from the same common ancestors, only members of aristocratic descent groups were eligible to hold leadership positions. The highest of these positions was typically reserved for an even narrower dynastic elite. In theory this was a system based on seniority within a patrilineal genealogy. Groups descending from the founder's eldest son outranked junior lines descending from his younger brothers to produce what is known as a conical clan.[11] However, this was more of an ideal model (or way of thinking) than a working political structure. Within certain cultural limits regarding who could compete for power, successful rulers usually found a way of justifying their authority even when seemingly fixed rules were broken to achieve it. Descendants of a founder's youngest sons wound up as rulers among both the royal Scythians and in the Mongol empire and provided elaborate explanations as to why this was the case. In this respect it is worth noting that actual kinship relations (based on principles of descent, marriage, or adoption) were operational only within local social units such as nuclear families, extended households, and local lineages. While higher levels of organization might employ the idiom of kinship, they were rooted in power relationships. This permitted nomadic confederations to incorporate a large number of unrelated tribes into a single supratribal polity where all might take the name of the dominant group without regard to their actual descent.[12]

Hierarchical social structures gave steppe politics a very different character than that found in more egalitarian societies. A cultural tradition of hierarchy inculcated more respect for established authority. One expected representatives of noble clans to rule and members of ordinary clans to follow. In describing a very similar hierarchical system of Polynesia, Marshall Sahlins observed that 'people of high rank and office ipso facto were leaders, and by the same token the qualities of leadership were automatically lacking—theirs was not to question why—among the underlying population'.[13] In hierarchical steppe nomadic societies, merit alone could not break this charmed circle but there were ways to tie into it, particularly by marriage. Brothers-in-law could hold considerable power, as did ruler's wives, without themselves being members of the ruling descent group. The Onggirats who married one of their daughters, Börte, to a young Chinggis Khan were recorded in the *Secret History of the Mongols* as explaining how well this worked as a political strategy:

> 'From old days, the Onggirat people
> Have the qatuns [ruler's wife] as shields,
> Have their daughters as intercessors.
> We live thanks to the good looks
> Of our granddaughters'.[14]

Börte's four sons would inherit the Mongol empire and their wives became powerful political figures in their own right.

Restricting those eligible to hold an office to particular descent groups also reduced the number of competitors

[7] ibn Khaldun 1969: 108.
[8] ibn Khaldun 1969: 120–21.
[9] Lindholm 1986.
[10] Among later Turko-mongolian steppe nomads and their descendants white bone descent groups with aristocratic status set themselves apart from the majority non-aristocratic black bone descent groups. They also had status distinctions that marked elder from younger brothers, senior and junior generations, and junior and senior lineages. Steppe nomadic groups that later founded empires all had this division while those that had more egalitarian leadership structures (and usually resisted political incorporation into larger polities) did not (Krader 1963: 322–26).
[11] Bacon 1958.
[12] Barfield 2002: 62.
[13] Sahlins 1963: 295.
[14] *Secret History*: chapter 64.

for leadership positions. Those holding power need fear only outside invaders and their own relatives, not internal rivals from other descent groups. When one examines succession struggles within the empires established by the Xiongnu, Turks and Mongols, the contestants were always closely related.[15] And once a ruling dynasty firmly established itself, it could prove remarkably long lived even if its members proved less than competent. The Xiongnu Shanyus in Mongolia descended from the empire's 209 BC founder Maodun lasted 500 years. The Mongol descendants of Chinggis Khan kept their ruling prestige for at least as long. The unbroken line of Ottoman sultans which originated in this steppe nomadic tradition ruled for 600 years before the collapse their empire after World War One. It was as if hierarchy were so much a part of the political DNA of these systems that the default was to keep dynasties intact whenever possible, even if only as figureheads. They were rarely destroyed by internal revolt although they were ousted by new rising powers who then began their own traditions. An example of this occurred when the great conqueror Tamerlane, a non-aristocratic Barlas Turk, established a powerful empire in central Asia during the late 14th century. He believed himself too much of an outsider to claim the right to rule in his own name so he installed descendants of Chinggis Khan to be the official heads of state and married a Chinggisid princess to make himself an imperial brother-in-law.[16] However his descendants largely dropped that pretence by making descent from the great Tamerlane the gold standard of their new Timurid line of rulers. This too had a long afterlife: Babur, one of his 16th century descendants, founded the Mughal empire in India and its unbroken line of emperors lasted until the British finally abolished their court in 1857.

Herodotus notes a similar hierarchical tradition among the Scythians whose dominant nomadic elite he labelled 'royal Scythians' and who 'take for granted that every other Scythian is their slave'.[17] According to the Scythians, this ruling elite consisted of the descendants of its dynastic founder Targitaus who had ruled a thousand years earlier. Their founding legend then explained that Targitaus' three sons were each given the challenge of taking possession of a set of sacred gold objects descended from heaven which would confer upon them a divine right to rule. The elder brothers failed because the objects caught fire when they attempted to get near them:

> 'But now, after the first two brothers had been beaten back by the blaze, the third and youngest approached it, and the fire went out; and so off he carried the objects to his home. The elder brothers, acknowledging the import of this, duly yielded their own stakes in the kingdom so that the youngest brother received it all.
>
> 'The sheer scale of the country being what it was, Colaxaïs fashioned out of it three kingdoms, one for each of his sons; but one of these kingdoms, the one in which the gold was kept, he made the largest'.[18]

In the 7th century BC, part of this elite group decamped to the sedentary regions south of the Caucasus mountains and according to Herodotus remained there raiding throughout the Near East for 28 years, i.e. over a generation.[19] While Herodotus describes it as a sojourn, the Scythians involved likely saw the move as more permanent. This region had extensive grasslands suitable for their horses and was a good place from which to dominate sedentary regions while still remaining nomadic themselves; in later periods it would become the power centre for several states of steppe nomadic origin, such as the Turkish Seljuks and Mongol Il-khans. However, when defeated by the Medes around 625 BC, the Scythians chose to leave the region and return to the steppe. This appears to have required a reconquest of the nomads there who had formerly been subordinated to them. Herodotus paints this as a struggle between the returning royal Scythians and a new generation born to their former captives and Scythian women they left behind.[20] The returning elite Scythians found themselves fought to standstill and were unable to overcome their opponents militarily. One of them therefore suggested that they change tactics, as the goal was not to conquer and dispossess an alien people but to regain control over former vassals. He recommended that they begin acting more like the rulers they were born to be.

> '"Men of Scythia, see what we are about! We are fighting our own slaves; they slay us, and we grow fewer; we slay them, and thereafter shall have fewer slaves. Now therefore my counsel is that we drop our spears and bows, and go to meet them each with his horsewhip in hand. As long as they saw us armed, they thought themselves to be our peers; let them see us with whips and no weapons of war, and they will perceive that they are our slaves; and taking this to heart they will not abide our attack".
>
> This the Scythians heard, and acted thereon; and their enemies, amazed by what they saw, had no more thought of fighting, but fled. Thus the Scythians ruled Asia and were driven out again by the Medes, and by such means they won their return to their own land'.[21]

[15] Barfield 1989.
[16] Manz 1999: 14.
[17] Herodotus, *The Histories* 4.20.
[18] Herodotus, *The Histories* 4.5, 7.
[19] Herodotus, *The Histories* 1.106, 4.1.
[20] Herodotus *The Histories* IV.1–2.
[21] Herodotus *The Histories* IV.3–4.

The veracity of this story is less important than what it tells us about the nature of hierarchy in Scythian society, that it was based on a culturally embedded conception which justified social and political inequality.

Political structure

A hierarchical social structure certainly provides an excellent framework for building a centralised polity, but the dynamics of the steppe pastoral economy made this difficult. A nomad population is scattered across a vast landscape and its labour is difficult to concentrate in one place or efficiently exploit. Livestock wealth was also unstable, subject to potentially catastrophic losses from freezing storms or disease. And, unlike stationary farming villages, pastoral nomadic communities always had the capacity of moving themselves and their animals if they were threatened with attack. Early sedentary states arose under very different conditions in places and societies where rulers could extract large surpluses of mono-cropped cereal grain and coerce people's labour for their own projects. As James Scott has examined in detail, such early states could not profitably extend their systems of exploitation to low-density subsistence economies (pastoral or agricultural) in marginal steppe, mountain, forest and desert zones.[22] Indeed their own subjects sometimes choose to flee to these zones as a way of escaping the burdens imposed upon them. At the same time the emergence of complex sedentary states created new opportunities for people living at their margins: just beyond their borders now lay concentrated resources for the taking, either by raiding or more peacefully by trading. These opportunities had existed previously but the scale of the resources and the scope of trading networks was now much larger. Moreover, by the beginning of the 9th century BC steppe nomads had developed a military capacity which greatly magnified the power of their small numbers. Throughout Eurasia horse-riding pastoralists adopted a highly effective form of mobile warfare which employed co-ordinated units of rapidly moving mounted archers who used the composite bow to devastating effect. Scott described this new system of interaction as qualitatively different from what had existed previously:

> 'What was unique was the unprecedented magnification of scale: of the confederations of mounted warriors, of the wealth of the lowland states, and of the volume and reach of trade. The emphasis on raiding in most histories is understandable in view of the terror it evoked among elites of the threatened states who, after all, provide us with the written sources. This perspective overlooks the centrality of trade and the degree to which raiding was often a means rather than an end in itself'.[23]

But the military power of sedentary states was growing rapidly as well and that put less well-organised groups of nomads at a disadvantage. If the Scythians had been able to raid the Near East with impunity in the mid-7th century BC, their expulsion was just the start of a process that soon led to the establishment of the enormously powerful Achaemenid Persian empire (550–330 BC) and the imperial unification of China under the Qin and Han dynasties (221 BC–220 AD). These empires had the capacity to campaign against the steppe nomads directly and control the flows of trade. Steppe nomads responded by creating peer polities of their own, not because their existing domestic organisation and economy demanded it, but because their relationship with the outside world did.[24] In a cross-cultural examination of pastoral nomadic societies in general, the anthropologist William Irons posited that '[a]mong pastoral nomadic societies hierarchical political institutions are generated only by external relations with state societies and never develop purely as a result of the internal dynamics of such societies'.[25] As we noted above, pastoralists in East Africa facing only other stateless rivals were very decentralised with few or no corporate organisations whereas nomads in the Near East and North Africa which dealt primarily with regional states did have permanent leadership structures and corporate groups, but these rarely exceeded ten thousand people in size. By contrast, the nomads of the Eurasian steppe developed complex and centralised political organisations ruling over polities ranging in size from a hundred thousand to as many as a million people.[26]

These large nomadic polities that arose across the Eurasian steppe zone from the 6th to 3rd centuries BC had a distinctive type of organisation. They were powerful imperial confederacies with centralised and strongly dynastic ruling elites which incorporated subordinate political units run by their own indigenous elites at the local level.[27] The resources needed to fund these large polities were available from other economies which could be tapped in a number of ways. These included raiding neighbouring agricultural societies, extorting subsidies from sedentary states, skimming profits off trade routes by selling protection, or by taking up trade themselves. Scythians occupying the more temperate and lower-lying western steppe zone appear to have raised the revenue they needed mostly by dominating adjacent productive agricultural areas and the lucrative trade routes running north of the Black Sea. Herodotus

[22] Scott 2017.

[23] Scott 2017: 244.
[24] Khazanov 1984.
[25] Irons 1979: 362.
[26] Barfield 1993.
[27] Barfield 1981*a*.

speaks of 'agrarian Scythians' who raised grain for cash and nearby Greek trading cities like Olbia which were bustling centres of commerce.[28] By contrast, the higher and colder Mongolian Plateau in the east had far less farming potential. Ancient Chinese historians claimed the nomads there practised no agriculture,[29] although once the Xiongnu empire was formed they did import farmers to diversify their economy. Nor did rich trade routes run across Mongolia: the famed 'Silk Roads' connecting China to the west ran south of the plateau along the string of oases in today's Xinjiang. The Xiongnu and their successors in Mongolia therefore employed a much more violent strategy dealing with China that required a far larger, more centralised, and more militarised political organisation than that found in the western steppe. Herodotus does not complain of Scythian attacks on the Greek world and he is clear that it was the Persians who started the war with them. By contrast, Chinese histories of the Xiongnu are mostly accounts revolving around periods of raiding and war punctuated by expensively bought peace treaties.[30] The western steppe would not experience this type of violence from steppe nomads until the arrival of the Huns in the 4th century or the Mongols in the 13th century, both of which gave priority to the eastern nomadic tradition of employing overt violence as a political tool.

The Xiongnu polity proved as durable as that of the Scythians, just as the Scythians were peer polities to the Achaemenid empire (and their late Assyrian predecessors) because all had been willing to pay off the nomadic leaders and provide them opportunities for trade in order to keep their frontiers peaceful. The large amounts of gold and other luxury items found in tombs of nomad rulers across the steppe zone, however, demonstrates that this flow of wealth was widespread. Seeking to acquire prestige goods was particularly important to rulers of nomadic polities because their redistribution by the ruling elite was the key to maintaining political and military power over people who were dispersed, highly mobile and had their own military capacity. Thus one of the key differences between nomadic imperial confederacies and sedentary states was that the latter depended on extracting wealth internally from the populations it ruled, while the former depended on redistributing externally obtained goods to the people it ruled. Contemporary sedentary historians often portrayed steppe nomads as greedy but the reason behind their insatiable demands was misunderstood. For example, early in the Han dynasty, Chinese officials implemented a strategy designed to corrupt and divide the Xiongnu rulers by overwhelming them with a stream of luxury gifts. The policy proved ineffective (even counterproductive) because the default option for nomadic rulers receiving such luxury items was redistribute the bulk of them to their subordinates – not hoard them – so that the gifts actually reinforced the Xiongnu elite's capacity to engage in political patronage.[31] Of course, should that flow of resources cease so would the nomadic polity. A nomad empire could not survive the collapse of its host and in Mongolia nomad empires and native Chinese dynasties tended to unify and collapse in tandem.[32]

Steppe nomadic societies which had both a strong tradition of aristocratic elites and centralised polities would seem to be prime candidates for building huge tombs as public monuments to reflect their growing power. Their first and greatest rulers would have the best and would set a pattern followed by their dynastic successors. This does not appear to be the case, however. Surveying the Xiongnu, Nikolay Kradin notes that

> 'according to historical records it was known that the Xiongnu organized magnificent funeral ceremonies for their chieftains. Modern methods of carbon dating show that all élite (terrace) tombs belonged to a short time period—the end of the 1st century BC and the beginning of the 1st century AD—the time of crisis for the Xiongnu Empire. An interesting question arises: where are the tombs of the first great rulers of the Xiongnu hidden?'[33]

A similar question might be raised about the Scythians on the Pontic steppe. As we will see, Herodotus describes the erection of earth mound tombs as part of the royal Scythian burial practice,[34] but no monumental tombs have been identified for the Scythian kings that Herodotus writes about. The tradition may well have become monumental only in his lifetime or just afterward. The earliest two such tombs at Solokha are dated to around 420–375 BC, Chertomlyk is dated to the middle and end of the 4th century BC, as is the greatest mound at Kul-Oba.[35] It would appear then that investment in monumental tomb building occurred not when these nomadic polities were at their most powerful beginnings but when the power of their elites began slipping. For both the Xiongnu and the western Scythians, the monumental tomb tradition coincided with period of political decline rather than growth and ended when their polities unravelled. The construction of large terraced tombs for Xiongnu rulers, for example, begins after their split into northern and southern branches in which the southern branch allied itself with China.[36] The western Scythians elite

[28] Herodotus, *The Histories* 4.17–18.
[29] Sima Qian, *Records* 2, 119.
[30] Yu 1967.
[31] Barfield 1981*a*: 56.
[32] Barfield 1989: 5–16.
[33] Kradin 2018: 18.
[34] Herodotus, *The Histories* 4.71–73.
[35] Aruz, Farkas and Valtz Fino eds 2006: 131.
[36] Brosseder 2009: 271.

also appears progressively drawn into the politics of the neighbouring Greek world through intermarriage and alliances in the 4th century BC, in sharp contrast to the autonomy they displayed when they beat back the invading Persians in the late 6th century BC. A pattern of investment in triumphant architecture when states are on the decline or even on verge of collapse is not unusual. As C. Northcoate Parkinson observed, among many other examples, the final completion of British India's magnificent colonial capital of New Delhi coincided with the end of its empire.[37]

From status to class

In examining the appearance of ostentatious graves across a variety of societies, the archaeologist Georg Kossack argued that they were the products of a particular type of frontier interaction which occurred when ranked societies organised around principles of kinship and descent encountered more complex state societies organised around class, particularly during times of cultural change.[38] In such situations the inherited status of elite ruling groups was potentially undermined by these interactions. One response was to transform formerly unmarked social distinctions into marked ones. This appears to have been particularly common when the nomadic ruling elite's way of life began diverging from that of the ordinary pastoralists who made up the bulk of the polity and its military force. The more the interests of the royal Scythians diverged from ordinary Scythians, the stronger would be their need to publicly demonstrate their aristocratic superiority though rituals which emphasised their right to rule, including the construction of ever larger monumental tombs. The anthropologist David Graeber noted that such royal public ritual events could send conflicting messages: 'On an explicit level, they declared that royal power is given in the nature of the universe; but at the same time, the whole logic of the ritual seems to say kings only have power only because people want them to'.[39]

Changes in nomadic societies which led to such class divisions are often attributed to them becoming more sedentary, but degree of movement is not necessarily the critical variable. If conditions are right, nomadic communities can have fixed bases and permanent dwellings but still remain fully pastoral and relatively egalitarian. My own ethnographic work in northern Afghanistan documented such a process in a nomadic community that had replaced yurts with houses during the 1920s after they were granted permanent land rights to their winter quarters. However they all remained fully engaged in the pastoral economy with families taking their flocks of sheep to nearby steppes in the spring and distant mountain pastures in the summer using more mobile tents before coming back to the winter village. There were relatively few differences in how either the rich or poor lived: all migrated and family labour (particularly milk processing by women) was central to pastoral production. It was only in the late 1960s, after more than two generations of living in winter villages, that a bigger transformation occurred. When the price of sheep began rising sharply in the wake of new economic development in Afghanistan, wealthier nomad families stopped migrating and hired shepherd crews to take care of their sheep. Cash payments replaced payments in kind for labour and milk processing was largely abandoned. With their greater profits from sheep raising, large flock owners invested in irrigated agricultural land farmed by share croppers, diversifying their economic base. The winter village was now more stratified between rich and poor pastoralists with a growing gap between them. From the outside it looked as if very little had changed: the people and animals were still the same but their pastoral economy had been transformed from one based on subsistence into a form of cash ranching where market relations prevailed.[40] In other words, it was not being settled in winter villages for 40 years which was the impetus to change, but the structure of the larger economy of which they were part. Although of course we have no direct observations for what was going on among the Black Sea Scythians in the 4th and 3rd centuries BC, it is more likely that economic changes, rather than changes in patterns of movement, were of greater importance, particularly if (as in 20th century northern Afghanistan) they led to a weakening descent groups solidarity and the emergence of class-based differences.

Declining social and political solidarity in kin-based descent groups when they become parts of money-based economies has been observed many times. Six hundred years ago, ibn Khaldun explained it as the product of an interaction between two very different types of societies: tribal and urban.[41] He defined tribal societies as human communities based on subsistence agriculture or pastoralism which organised themselves along kinship and descent lines located in geographically marginal areas with low population

[37] Parkinson 1957: 197–98.
[38] Kossack 1998: 33–34.
[39] Graeber 2001: 238.
[40] Barfield 1981*b*.
[41] Ibn Khaldun 1969: chap. 2. The great European sociologists at the turn of the 20th century independently revived these distinctions with different terminologies. Max Weber's (1921) contrasted *Gemeinschaft* (social relations between individuals based on close personal and family ties) with *Gesellschaft* (social relations based on impersonal ties) while Emile Durkheim's (Durkheim 1964) contrasted mechanical solidarity (social cohesiveness in small scale societies with little division of labour) with organic solidarity (social integration through dependency on complex division of labour). Neither cited ibn Khaldun.

densities. Drawn from his direct experience in North Africa and the Near East, he sub-divided these into three basic types: desert nomads (camel-raising Bedouin), steppe nomads (sheep and horse-raising Turks) and agricultural mountain villagers (Kurds and Berbers). Living in nucleated villages and cities located in broad river valleys and irrigated plains with high population densities, urban societies were human communities organised on the basis of residency and class in an economy that had elaborate divisions of labour. These urban societies generated large agricultural surpluses and supported a high level of craft production. Their cities were centres of institutionalised government, learning and high culture, and markets for both regional and international trade. Ibn Khaldun's tribal societies might be separated from urban societies geographically and beyond their direct administrative control, but they were closely linked by ties of trade and politics. It was his contention that when tribal people came into the orbit of urban societies, either by conquering them or moving into their rich lands, they lost their group solidarity.

Group solidarity remained strong in subsistence-based steppe pastoral societies because everyone's standard of living, consumption patterns, and dwellings was similar regardless of ascribed rank. Nomad chiefs might be able to eat and drink more than an ordinary people, but they ate and drank the same things. Regardless of rank, the yurts and waggons everyone used were of standard sizes and largely interchangeable. Elites might have more and better horses or fancier gear and weapons, but even the poorest steppe nomad also had horses to ride and weapons that were just as functional. What surpluses that did come into elite hands were invested in relationships because all leaders had to ask themselves, 'If I call them, will they come?' Leaders gained and maintained power in part by creating networks of patronage that relied on providing a strategic flow of resources to others. This included offering generous hospitality, funding communal celebrations, and gift giving of highly sought after and exotic luxury goods. (The future Chinggis Khan would attain his first great political alliance with the powerful Kerait khan by giving him a sable skin coat that was originally a wedding gift from his wife to his mother). This redistribution of goods was designed to produce a reciprocal obligation of service from those who received them and bind the social group together as a single whole.

The structure of urban civilisation was quite different and corrosive to both kin ties and systems of reciprocity. Its social structure was rooted in unequal and relatively rigid class divisions based on property ownership rather than kinship. Social status could be distinguished immediately by dress, some types of which might be legally mandated or prohibited to make their distinctions binding. Elites did not just eat more food and drink than lower classes, they ate and drank different things. And a slave's hovel and a ruler's palace only gained parity when an archaeologist would later excavate the ruins of both. It was a world of people who were absolutely dependent on one another economically but who lived as strangers socially. Elites here secured power by accumulating wealth for themselves and the states they ran through various forms of taxation, control of trade or markets, and large-scale ownership of productive land. Political leaders had royal authority, the ability to issue commands with the expectation that they would be obeyed because rulers had formal institutions to carry out their commands, by force if necessary. Tax revenue also paid for an army, either professional soldiers or employing mercenaries, which protected the state from invasion from without and against rebellion from within – no group solidarity required. In this world of luxury, everything one needed or wanted was obtained with precious metal or money and so the bonds of kinship atrophied. Rulers might still recite elaborate genealogies, but the ties they outlined no longer had any functionality. Not even your closest relatives could be counted upon in an environment that gave priority to the individual rather than the group.

Such centres of urban luxury always attracted people from the margins. While there are a lot of virtues that can be associated with the rough life of a steppe nomad, abstinence is not ranked high among them. Herodotus commented on the Scythians' insatiable desire for imported Greek wine, drunk undiluted,[42] and their habit of inhaling cannabis smoke in specially designed tents.[43] The many beautiful gold objects with Scythian themes produced by Greek artists as well as other imported goods are evidence of a growing market for such luxury products within Scythian society. These were more likely to have been obtained by trade rather than through gift exchange, increasing the Scythian elite's desire for the personal wealth needed to purchase them. Over the course of time their interest in redistribution declined in favour of their own self-interest. The 18th century economist Adam Smith argued that a similar process destroyed the basis of

[42] Herodotus, *The Histories* 6.84: 'The story goes that Cleomenes, following the arrival of the Scythians on this mission, spent so much time with them that it verged on the scandalous, and he acquired a taste for drinking neat wine. It was this, the Spartiates believe, that drove him mad. Ever since, they report, anyone hankering after stronger liquor has been described as "doing a Scythian"'. This notion that Scythians were heavy drinkers is specifically mentioned or hinted at by several other Classical authors, including Anacreon, Plato, Aristotle and Aristophanes (Porucznik 2013). Imported Greek amphorae and drinking cups are common finds at the 'royal' kurgans in the northern Black Sea region (cf. Simpson and Pankova eds 2018: 189, cats 114–15).

[43] Herodotus, *The Histories* 4.74–75; cf. Simpson and Pankova eds 2018: 164–68, cats 92–95.

feudalism in western Europe, an economic and political system also based on a subsistence economy and group ties rather than money.

> 'But what all the violence of the feudal institutions could never have effected, the silent and insensible operation of foreign commerce and manufactures gradually brought about. These gradually furnished the great proprietors with something for which they could exchange the whole surplus produce of their lands, and which they could consume themselves without sharing it either with tenants or retainers. All for ourselves and nothing for other people, seems, in every age of the world, to have been the vile maxim of the masters of mankind. As soon, therefore, as they could find a method of consuming the whole value of their rents themselves, they had no disposition to share them with any other persons. For a pair of diamond buckles, perhaps, or for something as frivolous and useless, they exchanged the maintenance, or what is the same thing, the price of the maintenance of a thousand men for a year, and with it the whole weight and authority which it could give them'.[44]

What we now admire most in the form of beautiful Scythian golden artifacts falls into this category of prestige goods. Their appearance in bulk coincides with the development of strategically located Scythian walled towns like Kamenskoe which served as trading posts, administrative centres and concentrations of craft activity.[45] To contemporaries this might have appeared to be evidence of increased power because the Scythian elite now ran a more complex and evermore wealthy polity. However, compared to earlier days, the status of the elite royal Scythians had become more class based, distinguished from ordinary Scythians not just by their aristocratic descent but by the unequal amount of property they possessed and the very different lives they lived. They remained culturally Scythian to be sure, but their power now rested as much on the control of wealth as did on people. But (as Smith noted about the European feudal elite) these changes undermined older structures of power relations at the expense of the nomadic part of their polity. It also reduced their ability to escape from trouble by abandoning territory. As the Scythian king Idanthyrsus told the Persians in 512 BC when they chided him for retreating instead of fighting,

> '"Here is how things are with me, Persian. I have never before fled any man because I was afraid of him – and I am certainly not fleeing you now. In fact, I am doing nothing at the moment that I was not in the habit of doing in times of peace. There is a perfectly good reason why I have not engaged you yet in battle, and I will tell you what it is. We have no cities – nothing that we need worry you might capture. We have no crops – nothing that we need worry you might destroy. Why, then, should we be in any rush to fight with you?"'.[46]

By the 4th century BC the Scythians did have such assets and were willing to defend them. Thus in 339 BC the long lived Scythian king Ateas felt it necessary to fight the Macedonian army of Phillip II to prevent him from even entering Scythian territory and lost his life in the ensuing battle.[47] The Scythians got even in 331 BC by destroying the army of Alexander the Great's governor of Thrace when he attempted to take the trading city of Olbia, but these cases both demonstrated that the Scythians no longer saw avoiding battle as a viable option. But the Scythians also had to deal nomadic rivals on the steppe like the Sarmatians who still retained the organisation of their ancestors and began ever more aggressive attacks on them in the 3rd century BC.[48] They followed a long pattern that would repeat itself for another millennium. Just as the Scythians had driven the Cimmerian nomads out of the region in the late 8th century BC, the Sarmatians would do the same to the Scythians in the 2nd century BC. With a bit of time lag, the same process occurred in the eastern steppe when the formerly marginal Xianbei took control on the Mongolia from the northern Xiongnu in the mid-2nd century AD, restricting the southern Xiongnu to the borderlands where they played an ever-larger role in Chinese politics.[49] And if the theories that trace the Huns' origin to these defeated northern Xiongnu are correct,[50] it was they who displaced the Sarmatian Alans on the Pontic steppe in the late 4th century. Ibn Khaldun's take on this was that success in building a successful mixed state came at the price of internal solidarity and that made resistance to new groups that had more cohesiveness difficult:

> 'The things that go with luxury and submergence in a life of ease break the vigor of the group feeling, which alone produces superiority. When group feeling is destroyed, the tribe is no longer able to defend or protect itself, let alone press any claims. It will be swallowed up by other nations'.[51]

Because of their confederacy structure, it was relatively also easy for invading steppe nomad groups to incorporate disaffected nomads in the regions they conquered. The Sarmatians may have replaced the Scythian elite, but many ordinary pastoral Scythians

[44] Smith 1776: bk. III.4.10.
[45] Rolle 1989: 122.
[46] Herodotus, *The Histories* 4.127.
[47] Gardiner-Garden 1989.
[48] Istvánovits and Kulcsár 2017.
[49] Barfield 1989: 84–90.
[50] Maenchen-Helfen 1973.
[51] ibn Khaldun 1969: 109.

undoubtedly just rebranded themselves as members of the new polity.

Massive tombs

Kossack argued that elites from ranked societies sought to demonstrate their status parity with (or superiority over) elites in neighbouring class societies when the two came into contact.[52] But, at least with the steppe nomads, there may have been another reason: to reconfirm their superior status to their own people. As we discussed above, societies that based social status on ascribed hierarchy assumed that some groups of people were inherently superior to others by birth, or at least filled different functions. At an extreme level, such as the caste system in India, this might mean that no group could ever be exactly equal to another.[53] At the opposite end of the spectrum were societies which rejected all notions of inherent social differences as when ibn Khaldun asserted that

> 'Prestige is an accident that affects human beings. It comes into being and decays inevitably. No human being exists who possesses an unbroken pedigree of nobility from Adam down to himself ... This means that all nobility and prestige is preceded by the nonexistence of nobility and prestige, as is the case with every created thing'.[54]

The Scythians and many other steppe nomads did believe that certain groups had an inherent right to rule, but that belief could be undermined after their elites began to rule more complex polities which included nomadic and non-nomadic populations that were culturally different. Scythian rulers had to maintain a fine balance in such a situation and Herodotus noted that their people were more than a little xenophobic: 'as to foreign practices, the Scythians are another nation who would run a mile rather than adopt the ways of some other people, and of the Greeks in particular'.[55] As examples, he cited two Scythian kings killed by their subjects when they were discovered participating in Greek cult rituals.[56] By elaborating and expanding the size of royal burial monuments, rulers could demonstrate that they not only respected Scythian cultural values and rituals but could reproduce them more magnificently as well. As these monument building projects were post-mortem rather pre-mortem, their construction was designed not only to reflect the power of the deceased rulers buried within them, but to reinforce the continuing authority and legitimacy of their successors.

Monumental tombs constructed in sedentary societies were almost always pre-mortem. Rulers could not trust others to lavish time and resources on such projects after they were dead so they needed to make sure these testaments to their own glory were complete before then. Some of the most famous, such as the pyramids of the Egyptian pharaohs at Giza built in the mid-3rd millennium BC or the massive tomb mound complex built at the end of the 3rd century BC in Xian by China's first emperor, Qin Shih-huang-ti, took decades to complete. Rulers devoted much of their reign and revenue to these projects. The heirs of the builders needed only to carry out the final rituals which would place the dead ruler within them for eternity. Carrying out this function neither tested the successor's capacity to rule or the stability of the state. Indeed the Qin dynasty collapsed only two years after the death of its founder. The construction of massive post-mortem tombs, by contrast, was the responsibility of a ruler's heirs. Here the organisation of the burial began the building process rather than ending it. The successors to the dead ruler needed to have enough internal unity to manage such a large construction project and the political capital necessary to command the needed workforce. Most steppe nomadic societies proved historically unwilling to make such investments and the post-mortem tombs of their leaders were much smaller and often hidden rather than public.[57] As Kradin noted above, the tombs of earliest and most powerful Xiongnu rulers have never been found, nor have the tombs of Attila the Hun or Chinggis Khan. The captives who dug the graves of the latter were all executed so that the knowledge of their location would not spread. So what was the incentive for Scythian rulers of this period (and Xiongnu ones a bit later) to make such investments?

Herodotus describes Scythian burials in some detail and for ordinary people,

> 'Any other Scythian, however, when he dies, will be laid in a wagon by his closest relatives and taken on a tour of all his friends, each of whom will welcome the entourage and entertain them – and the corpse will have the same identical portions laid before it as everyone else. For forty days, commoners are taken around in this way and then laid to rest'.[58]

Funerals of kings followed a similar but much more elaborated pattern, which I summarise by focusing on the king's body:

[52] Kossack 1998: 33.
[53] Dumont 1970.
[54] ibn Khaldun 1969: 106.
[55] Herodotus, *The Histories* 4.76.
[56] Herodotus, *The Histories* 4.76–80.

[57] The accidental archaeological discovery in 1978 at Tillya Tepe in northwest Afghanistan of a 1st century tribal chief's tomb surrounded by at least five equally spaced individual tombs of women gives a modest example of such a funerary moment as the place of burial – an old abandoned settlement mound (*depe*) – resembled a kurgan without the necessity of constructing one and the (unrobbed) graves were effectively hidden in plain sight (Sarianidi 1985; 1989; cf. Simpson, this volume).
[58] Herodotus, *The Histories* 4.73.

> 'The burial places of the kings lie in the land of the Gerrhians, at the point where the Borysthenes becomes navigable. The Gerrhians, when their king dies, dig a large square pit in the ground, while the Royal Scythians slit open the stomach of the corpse, clean it out, fill it with ground aromatic nut-sedge, incense, celery-seeds and aniseed, then sew it back up again and cover it with wax. Next, when everything has been made ready, they lift up the corpse, and convey it by wagon to another tribe. When the people to whom it has been transported receive the corpse, they follow the example of the Royal Scythians and cut off part of their ears, shave off their hair, cut their arms, score their foreheads and noses and stab arrows right through their left hands. Then, with an entourage of those it has already visited, the corpse [of the king] is taken in its wagon to another subject tribe. Once the corpse has been taken on a complete tour of Scythia, they finally come to the Gerrhians, whose settlements are the remotest of all the various tribes in the empire, and to the places of burial. Here, after they have placed the corpse upon a pallet in its tomb, they stick spears along one side of it and then the other, extend planks of wood over them and make a roof for it out of rush matting; next, in the open space still remaining in the tomb, they strangle and bury one of the king's concubines, his cup-bearer, his cook, his groom, his steward and his messenger, some horses, a choice selection of all his other possessions and some golden cups. Nothing made of silver or bronze is ever used. Once that is done, they all furiously compete with one another to raise a huge barrow of earth, as vast as they can possibly make it'.[59]

The building of monumental tombs was a public demonstration of unity within the Scythian ruling elite and the non-royal subordinate groups which made up the bulk of the polity. At a minimum, it demanded enough political unity so that all the necessary people could be brought together in a short period of time. It also required a high degree of political stability. If a ruler's death was the consequence of internal strife or his heirs engaged in an immediate war of succession, then a hasty burial or none at all would be more likely. The subordinate groups also had to be willing both to participate and provide the labour needed for constructing the mound. From a political point of view, the ritual of taking the king's corpse to all the component tribes in turn had considerable significance. It was one of the rare occasions when the Scythian nomadic polity overtly expressed its sovereignty over its component members. Having each succeeding tribe accompany the corpse to the next tribe meant that the number of people at each event was ever larger. By the time they arrived at the burial place, all the labour needed to build the mound was at hand. While Herodotus makes no mention of this, such a large representative group could also have been used to confirm the rightful succession of the new ruler. The Mongols famously held such tribal assemblies (*kuriltai*) to elect new rulers, although these usually occurred long after any funeral. At the very least, gaining the cooperative labor needed to erect the mound from a mobile population was tangible proof of a new leadership's continuing authority.

Monumental kurgans were built of the steppe's native grass sod with interspersed rings of mud, and stabilised by the addition of a stone circle around the foot. Missing today are the outer finish made of smoothed mud or stone and a statue on top.[60] These were major constructions. It is estimated that the great mound tomb at Chertomlyk used a million pieces of sod cut from around 75 hectares of adjacent steppe. The mound's total volume of mud and sod mix was 80,000 cubic m and its stone facing required around 8000 cubic m of quarried stone.[61] While many scholars see the use of sod as symbolic,[62] the ruler taking the pasture with him into the next world, practicality and engineering requirements were probably stronger factors. Once steppe sod was cut through, successive strips could be readily cut and easily transported without the need for skilled labour. Moreover, the sod had a strong internal structure that held firm when laid and would not erode – more like working with bricks than soil. Although a by-product of its construction, the large area of bare earth surrounding the mound set it off in a most striking fashion. It also removed the land from productive use for many years, possibly decades, a type of conspicuous consumption by destruction that was as lavish in its own way as the gold grave goods interred within the tomb. As all these figures indicate, the living rulers who erected such tombs for their immediate predecessors were making substantial investments at the beginnings of their reign. If there were any lingering doubts about their natural superiority and right to rule, these investments were designed to put those doubts to rest. The large number of similar but smaller tombs in the areas close by the big mounds may also be evidence of status inflation in which lower ranking members of the Scythian elite sought to imitate the burial styles of those just above them as their own resources grew.

Sacred landscapes and their dangers

Steppe nomads appear to have given a special status to the burial grounds of their leaders. Idanthyrsus, the king of the Scythians who confronted the Persian invasion by retreating, had explained that there was one exception to his policy of refusing to defend territory:

[59] Herodotus, *The Histories* 4.71.

[60] Rolle 2011: 115.

[61] Aruz, Farkas and Fino eds 2006: 169–73.

[62] E.g., Rolle 1989; Parzinger 2017.

> '"If you really want to get to grips with us in a hurry, then there are always the graves of our forefathers. So go ahead – find and desecrate them, if you can! Only attack those graves, and you will soon discover whether we are fighters or not"'.[63]

Of course the Persians did not know where they were and Idanthyrsus was not about to tell them. Unlike sedentary states that invariably located their royal tombs in or near their capitals, the Scythians and other steppe nomads located them in distant places, at least as long as its elite remained nomadic. Herodotus reported that the Scythian royal burial ground was located in the land of the remotest Scythian tribe 40 days travel north up the Dnieper (Borysthenes) river.[64] One reason for choosing remote spots was to ensure that access to them would be limited. Among the Mongols this was incorporated into the concept of *qoruk*, a secret and restricted zone for the burial of their leaders and other elite activities.[65] People who lived there were often given the responsibility of keeping these areas secure since the integrity of the tombs served as a proxy for the integrity of the polity. But if nomads could move out of harm's way when faced with aggression, their tomb sites were fixed in specific places. This made them a target for their enemies for symbolic reasons as well as the possibility of recovering rich grave goods.

Parzinger has argued that invading groups sought to put their own stamp on the land not by building new monuments but desecrating old ones as proof of their superiority.

> 'Several factors suggest that the intent of these new intruding groups was to open and rob the royal graves of earlier rulers in the region and, in the sense of a *damnatio memoriae*, to desecrate the graves, and with that to break the sacred power of the former lords before the eyes of their people and then implant their own. When so much energy is invested in the destruction of kurgans and the annihilation of their significance, then this underscores all the more impressively the profound meaning that these burial monuments must have had for the population who built them'.[66]

However such a tactic need not be just the product of the displacement of a ruling group. The Wuhuan, who had been incorporated into the Xiongnu empire in the early 3rd century BC, signaled their break from that polity by raiding the Xiongnu royal tombs in 78 BC without being able to displace them from Mongolia.[67] Such desecrations could also be a consequence of civil strife. Brosseder's analysis of Xiongnu large terraced tombs presents evidence that they were despoiled relatively soon after they were completed at a time when the Xiongnu elite was divided.[68] If this were the case it would be interesting to determine the level of selectivity: for outsiders all tombs would be targets but for insiders it would be only those of their rivals.

The symbolic importance of elite graves appears to have led to different strategies to protect them. One widespread approach common to many steppe nomads was to make them all but invisible. This meant keeping the location of the cemeteries secret and, if found, making it difficult or impossible to find the individual graves. The best way to do this was to avoid building mounds entirely or providing other signs of a tomb's location. An enemy could not despoil what it could not find. This had the added advantage of making it easier for nomadic groups to emigrate to new territories because they were not held hostage by the need to protect ritual sites. Even at the height of their power the Mongols chose this approach. In the 13th century, Friar William of Rubruck observed that the Mongols maintained an empty yurt and guards near the graves of the descendants of Chinggis Khan but gave no indication of where the graves actually were. By contrast, Rubruck noted that the neighbouring Turkic Kipchak nomads (Cuman, Polovtsy) maintained a kurgan tradition similar to that of the Scythians in which they 'raise a great tumulus over the dead, and set up a statue to him, its face to the east, and holding a cup in its hand at the height of the navel'.[69]

For those nomadic populations with the kurgan tradition, a strategy of supersizing them might be seen as added protection. With the tombs themselves deep underground and a large mound above, no casual raiding party would have the time to despoil them. But since their erection coincided with a period of elite settlement in fortified towns like Kamenskoe, the structures of dead may have simply reflected the changing ideas of what rulers now saw as appropriate to the rank and dignity of those who were interred. Their locations also shifted closer to these centres. The rich 20 m high kurgan at Solokha and other tombs in this area, for example, are comparatively close to Kamenskoe, hardly requiring a 40-day trek to Gerrhus. If hiding tombs allowed nomads the ability to abandon old homes for new ones more readily, the willingness to do this could divide nomadic societies. For ordinary nomads one piece of grassland was pretty much like another and not worth defending if that risked their destruction. By contrast nomadic rulers appear to have been more attached to territory. Herodotus recounts that when the Scythians began driving into the Pontic

[63] Herodotus, *The Histories* 4.127.
[64] Herodotus, *The Histories* 4.71.
[65] Barthold and Rogers 1970; Serruys 1974.
[66] Parzinger 2017: 245.
[67] Barfield 1989: 59.
[68] Brosseder 2009.
[69] Rockhill 1900: 81–82.

steppe and clashed with the then-resident Cimmerians, a dispute broke over the best course of action:

> 'As the Scythians descended upon them, the Cimmerians, conscious of how vast was the army coming their way, debated what they should do, with sharply polarized and vehemently held opinions being expressed on both sides. But of the two opinions, it was that of the king and his family which was superior. The line of argument advanced by the mass of the people was that there was no alternative to flight, and that they certainly ought not to risk a clash with such a horde, while the king and his family argued that they should stand their ground against the invaders, and fight for their land. Neither side, however, was willing to be persuaded by the other: neither the royal party by the people, nor the people by the royal party. The people planned to abandon their country without a fight, and simply hand it over to the invaders, while the princes held that it would be best to die and be laid to rest in their own land, and not to flee with the mass of the populace; they reflected on all the good things that they had known in their homeland, and on all the evils which were likely to befall them were they to abandon it. Accordingly, once they had resolved this, they divided themselves up into two groups of equal numbers, and fought with one another, until they had all perished in mutual slaughter'.[70]

The Xiongnu displayed a similar split when their empire first came into existence:

> 'The ruler of the Eastern Barbarians sent an envoy to Maodun saying, "The Xiongnu have no way of using this stretch of wasteland which lies between my border and yours. I would like to take possession of it!" When Maodun consulted his ministers, some of them said, "Since the land is of no use you might as well give it to him", while others said, "No, you must not give it away!" Maodun flew into a rage. "Land is the basis of the nation!" he said. "Why should I give it away?" And he executed all the ministers who had advised him to do so'.[71]

In building mighty kurgans the Scythian elite were making the same symbolic statement: they would rather die than abandon what they had. In the end, like Ozymandias with whom we opened the paper, these mighty statements of former power are now all that are left to speak for them.

[70] Herodotus, *The Histories* 4.11.
[71] Sima Qian, *Records* 2,168.

Saka 'Animal Style': the 'mysterious picture' on a carved bone container from central Kazakhstan

Arman Z. Beisenov[1]

Abstract

Today many new monuments belonging to the Tasmola culture of central Kazakstan, have been studied and their data used in multidisciplinary research. A large series of radiocarbon samples have been collected, mostly analysed in the laboratory of the Royal University of Belfast, firmly and now dating this culture to the 8th–5th centuries BC. A special place concerns objects made in 'Animal Style' and these include a group decorated with what have been termed 'mysterious pictures'. A new discovery of such an object was made in the Bayke-2 cemetery, situated in the Karaganda region of central Kazakhstan. This is a small decorated container made by sawing a section from a long bone, probably that of a cow. The outside is decorated with representations of as many as 16 animals, both herbivores and carnivores. The centre is occupied with the figure of a saiga antelope being mauled by predators, the latter represented by large felines and wolf-like creatures. In the art of the Saka tribes of the Eurasian steppe, the 'Animal Style' appears to have been a sort of codified world view. The composition with the 'mysterious picture' shown on this bone case is built on the opposition of herbivores and predators, and perhaps points to an eternal struggle in life. Such an interpretation is applicable to the life of ancient steppe peoples, and the society of nomads and warrior riders. Another important feature is connected with the fact that the container is found in a small grave which hardly represents an elite monument. This means that this genre of image was not the prerogative of rulers or other individuals of high status. The additional discovery of a bronze mirror and stone altar in this grave suggest that it may belong to a female burial. It dates to the 7th century BC.

Keywords: Central Kazakhstan; Tasmola culture; Eurasian steppe; cemeteries; Saka 'Animal Style'; 'mysterious pictures'

Introduction

The term Saka is used here to refer to the early Iron Age population of eastern Eurasia and equivalent to the Scythians of western Eurasia. In central Kazakhstan, Saka monuments are defined by an archaeological culture known as Tasmola and first defined by M. Kadyrbaev over half a century ago.[2] At the present stage, our understanding of the Tasmola culture has been enlarged not only by the exploration of numerous new monuments,[3] but also with the results of multi-disciplinary research, including extensive analysis of anthropological data[4] and the establishment of an absolute chronology through the analysis of over 40 radiocarbon dates from both burials and settlements. These analyses were mainly conducted in 14C CHRONO Center for Climate, Environment and Chronology Studies at the Royal University of Belfast and partly already published in 2016.[5] Based on these analyses the Tasmola culture is currently dated to the 8th–5th centuries BC. Moreover, in the same laboratory the first study of the diet of the local population of this culture was also made and the results show that the Saka tribes of central Kazakhstan used millet for food.[6] This is a very interesting result for the steppe cattle-breeding region, whose population has always been considered 'pure nomads' and opens up new opportunities for future research on the local economy and lifestyle.

Further research on Tasmola culture monuments have been conducted in the eastern part of central Kazakhstan. With regard to its geomorphology, this area – like the whole of central Kazakhstan – is included in the vast province called the Kazakh uplands. This territory is on the edge of the steppe and consists of rolling hills and low mountains rising to a height of 1000–1500 m above sea level. Speaking figuratively, this land is 'ready for using stone slab', which played the role of the main material used in the construction of kurgans, settlements and standing stones. It is in this region that the Bayke-2 cemetery is located, specifically in the eastern part of the Karaganda region and on the northern slope of Karakuys mountain (Figure 1).

Materials and methods

From 2000 to 2003 the author conducted continuous research along the northern slopes of the Karakuys mountain, and discovered numerous cemeteries and

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[2] Kadyrbayev 1966.

[3] Beisenov 2013*a*; 2015; 2017*a*.

[4] Beisenov *et al.* 2015.

[5] Beisenov, Umitkaliev and Kulkova 2016.

[6] Svyatko and Beisenov 2017.

Figure 1. Location map of the Bauke-2 cemetery

settlements of the Bronze Age and early Iron Age periods. The Bayke-2 cemetery was first explored in 2002, but excavations began in 2015, after interesting results had already been obtained from many other sites in the region, including a cemetery at Bakybulak and settlements at Sarybuyrat and Kyzylsuir-2 which belong to the early phase of the Tasmola culture.

The Bayke-2 cemetery is located 14 km south of the village of Nurken. Nearby there are numerous other sites of burials, as well as small Kazakh wintering grounds where individual families of local farmers live. The nearest wintering ground to Bayke lies 2.4 km to the northeast. The area of the Bayke-2 cemetery itself is very convenient for cattle breeding. There are good pastures with high grass, springs and mountain gorges which offer good shelter in winter. The Bayke-2 cemetery contains 13 funerary structures and seven small sacrificial structures (Figure 2). The bulk of the funerary structures belong to the Tasmola culture. The sacrificial structures are round or oval in plan: these are one of the known monument categories of the Tasmola culture,[7] but are also known in the territories of other Saka cultures of Kazakhstan. Several excavated kurgans belong to the Korgantass period. This period replaced the Tasmola culture in central Kazakhstan and dates from about the 4th–2nd centuries BC.[8] So-called kurgans with 'moustaches' are little-known to European readers but are distributed in large numbers in central Kazakhstan, and to a lesser degree in other parts of the country, as well as in the steppes of the southern Urals in Russia, and for many years, experts were undecided as to their cultural and chronological context.[9] The eastern part of the complex include two stone ridges orientated to the east and attributed by some researchers to the Hun period, whereas the western part belongs to the Tasmola culture.[10]

The burial structures in the Bayke-2 cemetery were not preserved in their original form. Before factory bricks, cement and concrete became available recently, people often re-used stones from ancient structures for the construction of their houses and graves. As part of the cemetery there are two Kazakh *mazars* with stone walls and more than 50 small stone tombs. Many of the stones used to build these were taken from the kurgans of the Bayke-2 cemetery, indeed all the kurgans show signs of destruction and the height of their embankments, as well as their diameters, are not always easy to measure.

Kurgan 7 is a 'moustache' complex. The western kurgan (7), with a diameter of 12.5 m and height of 0.35 m, included a grave containing a human burial, perhaps that of a woman. The eastern kurgan (7a) had a diameter of 9 m and height of 0.3 m but lacked a grave or finds. The northern ridge has a preserved length of only about 30 m whereas its southern equivalent is about 15 m. The burial in kurgan 7 was robbed, and the cranium and entire right arm of the skeleton were

[7] Beisenov 2015: 33–34, fig. 15.
[8] Beisenov *et al.* 2016*a*.
[9] Beisenov 2002; 2017*a*; Botalov, Tairov and Lyubchanskii 2006.
[10] Beisenov *et al.* 2016*b*; Beisenov, Duisenbay and Svyatko 2017; Beisenov, Umitkaliev and Kulkova 2016.

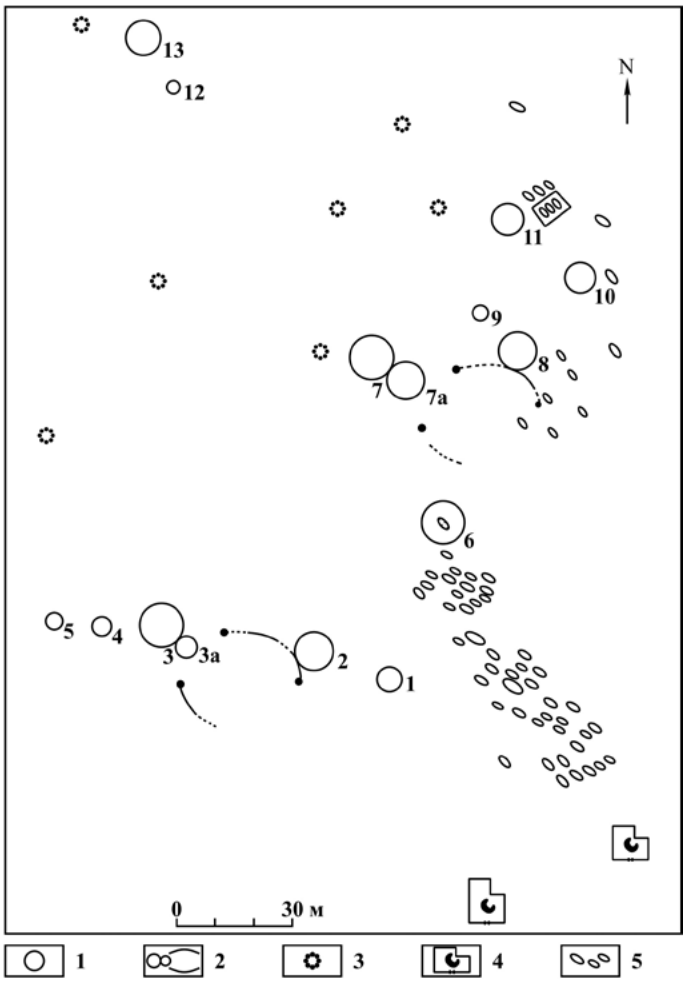

Figure 2. The plan of the Bayke-2 cemetery: 1, kurgans; 2, kurgans with a 'moustache'; 3, Kazakh *mazars*; 4, Kazakh small graves

missing. Nevertheless, a bone container, a bronze mirror and a conical clasp made of paste were found nearby (Figures 3–4). The depth of the grave is 1.7 m. The clasp is made from paste: these are usually called *vorvorka* in the Russian literature and were used to connect belts; cast metal versions were also used on horse bridles. One undamaged buckle was found in the grave, and fragments of a second were also found. These two clasps were evidently used to fasten the straps of a leather handbag which originally contained this mirror.

Objects such as mirrors and small stone altars are normally regarded as special items used in cultic or magical rituals, and women buried in such graves have been interpreted in some publications as being members of a priestly class. However, this is difficult to credit as there are simply too many graves of this type for all to have belonged to priestesses. It is more likely that where such items are found in small burial mounds such as this, they were simply female accessories used in everyday life and the identification of burials of priestesses should include other criteria. At present, early mirrors with a lateral straight handle belong to the early Saka period. A similar type of mirror was found in the so-called 'Sauromatic' monuments in western Kazakhstan, leading to a recent proposal that such mirrors are 'Sauromat' and that the early Sarmatians came from the Saka world.[11]

The decorated bone container found in kurgan 7 was cut from the long bone of a large animal, possibly a cow. It measures 8.3 cm high, 4.8 x 3.9 cm across at the base and 4.3 x 3.2 cm at the top. Two holes for fixing the lid and bottom were made in the upper and lower parts respectively. This object was most probably designed as a container for small objects such as needles. The surface was coloured green and red, and decorated in carved low relief with images of herbivores and predators, with a swirling pattern in the centre (Figures 5–7).

The central part of the scene is dominated by the image of an overturned saiga antelope with long, graceful, extended legs being attacked by three predators.[12] The scene is a masterclass in dynamic expression and the predatory characteristics of greed and blood-

Figure 3. Burial in kurgan 7: 1, stone altar; 2, bronze mirror; 3, clasp; 4, bone container

[11] Beisenov, Duisenbay and Svyatko 2017: 230.
[12] Beisenov *et al.* 2016c.

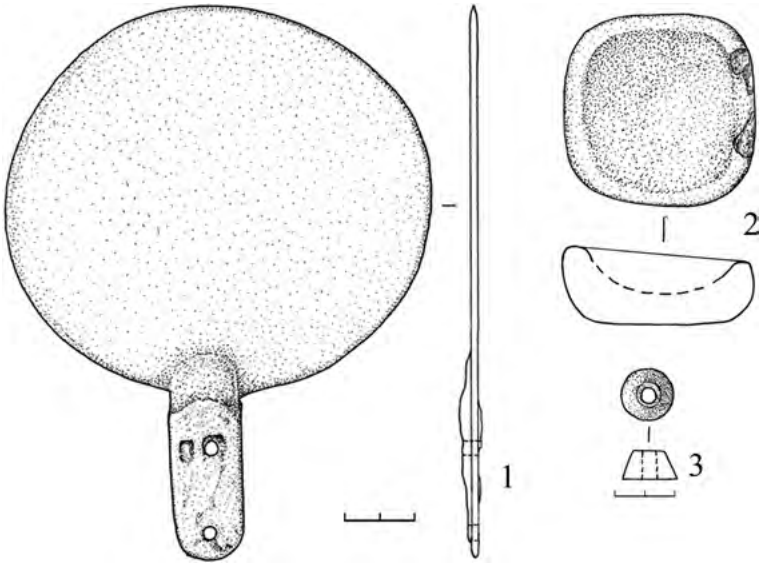

Figure 4. Grave-goods from kurgan 7: 1, mirror; 2, altar; 3, clasp

Figure 5. The decorated bone container from the Bayke-2 cemetery

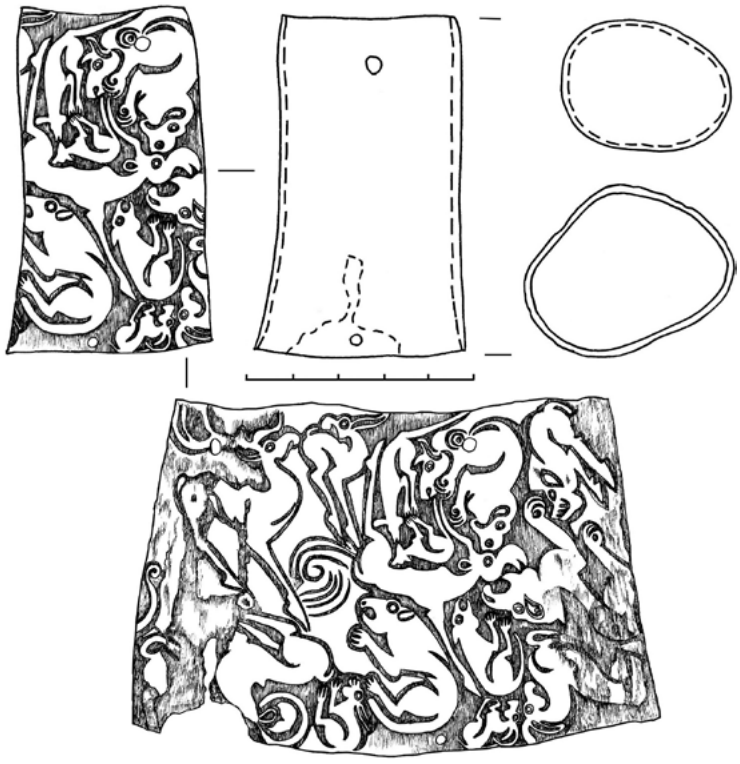

Figure 6. Drawing of the bone container

thirstiness are skilfully depicted and in this respect, the craftsman who made it captured the essence of 'Animal Style'. The container is carved with representations of as many as 16 animals and we find two types of opposing types: 10 are herbivores, including one resembling a hare, and there are six predators with three main characters attacking the antelope, as well as three others. If we consider that four animals – the saiga antelope and three predators – make up the main design, then the others play a secondary role.

Two parts of the composition should be noted. The first is the main design showing the scene of mauling and this is the most understandable part of the composition; the second shows the other animals, representing an addition to the main idea, but why are the latter shown at all? Do we see a simple desire of the craftsman to fill the entire space? Or was it to underline the visual message in some manner? It is not easy to answer these questions, and in either case the ancient craftsman has succeeded once more in creating a 'mysterious picture'.

Mir K. Kadyrbaev was the first to discover such an object with multi-figure picture in the Tasmola culture in Kazakhstan. This was a horn belt buckle found in 1961 in kurgan 3 of the Tasmola V cemetery. According to that scholar, the 'multi-figure drawing' was cut into the surface and the central place occupied by a boar

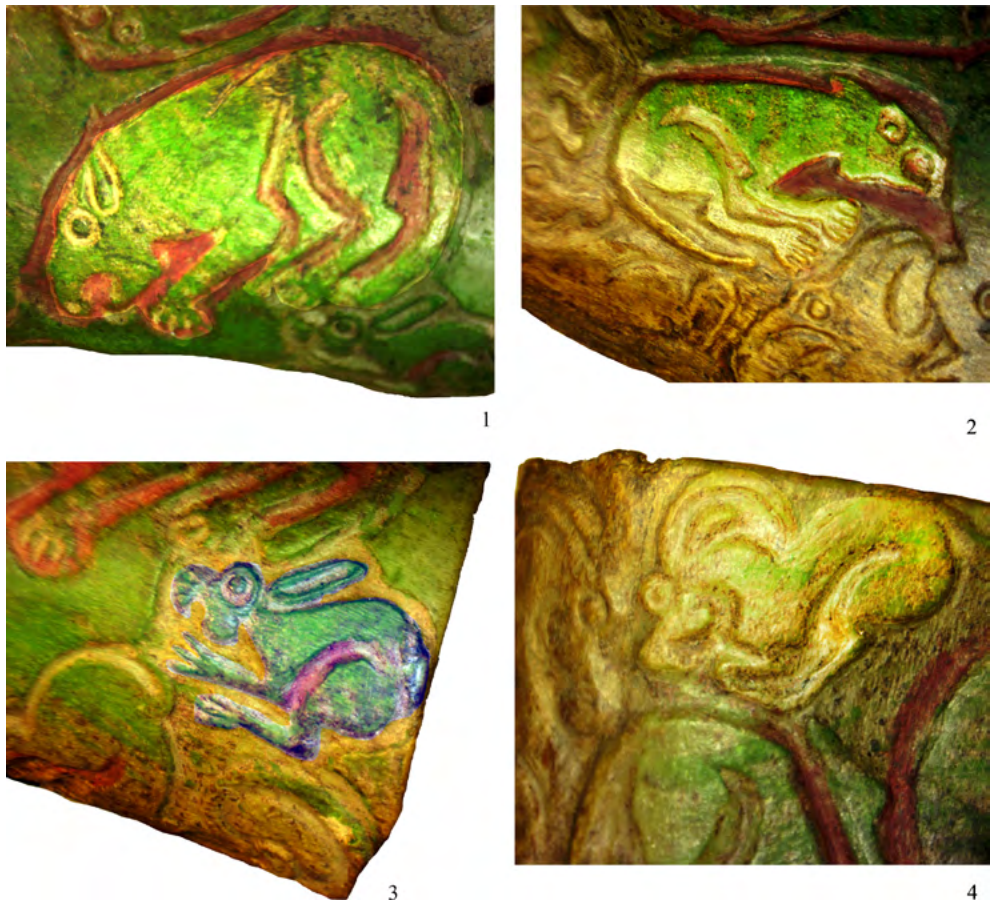

Figure 7. Details of some individual figures: feline predators, 'hare' and goat

surrounded by the heads of five herbivores.[13] In the mid-1970s M.K. Kadyrbaev found another example – a bone spoon with a 'zoological puzzle' of a wolf, eagle and the head of a saiga antelope – in the Syntas kurgan on the banks of the Ilek river, near Aktobe in western Kazakhstan, and thought to belong to the 'Sauromat' period.[14] However, these isolated finds failed to attract the attention they deserved.

It should now be noted that the link between these finds from central and western Kazakhstan is no coincidence. Monuments of the 6th–5th centuries BC located on the shores of the river Ilek can no longer be considered Sauromat but instead are a local phenomenon, the origin of which is instead closely related to the Saka world east of the Ilek river and early Saka cultures of the Aral Sea, northern and central Kazakhstan. There are other finds which prove these connections: mirrors with a side handle, a massive tapered earring and certain types of vessels, as well as some details of the burial rite such as wooden structures above the grave and a dromos.

The corpus of multi-figure compositions was later updated with new discoveries of the early Saka period in Tuva. A.D. Grach was the first to suggest the term 'mysterious pictures' as a preliminary concept based on his finds from this region, and it has now become common in Eurasian archaeology.[15] Scenes depicting the angst of an ungulate animal were examined by Yu.B. Polidovich, taking as an example a bronze plaque found near Pavlodar (Kazakhstan), as well as some other finds.[16] That researcher believes that three predators embody the idea of unity of a tripartite nature, and that the very scene of mauling was connected with the idea of sacrifice. The connection of 'mysterious pictures' with the early Scythian 'composition formula' is based on the scene of torment. In D.G. Savinov's opinion, according to its internal content, early Scythian multi-figure compositions express ideas of 'reincarnation, transition, sacrifice and multiplication'.[17]

As in many other cases, the container found at Bayke-2 shows herbivores of a type known elsewhere in the early Saka repertoire, namely the antelope, deer, goats and wild boar. The boar is a dangerous animal, aggressive and endowed with power. The early Saka boar is shown in an appropriate manner: it is an angry beast, with a curved back, powerful snout and large teeth revealed in its open jaws. The image of a 'hare' with a three-fingered paw is interesting as it is rarely

[13] Kadyrbayev 1966: 397, fig. 62.
[14] Kadyrbayev and Kurmankulov 1976.
[15] Grach 1980: 78, fig. 110.
[16] Polidovich 2006.
[17] Savinov 2012: 52.

depicted. The predators are represented by felines and wolf-like beasts. All three large figures of attacking predators show images of felines.

It can be seen that in the composition on this container there is a strong stylisation in the transmission of animal figures, also present on other images of the Tasmola culture, for example that of the tigers represented on gold plaques found in the Taldy-2 cemetery.[18] There, static figures of animals are shown in a less realistic form than in many other images of the early Saka period. It seems that this craftsman had never seen a tiger, or that realism hardly mattered for him. In either case it is significant as there does not appear to be any significant chronological gap between realistic and more stylised images of this type.[19]

The bone container from Bayke-2 shows examples of the ancient fauna of Kazakhstan. A feline predator – the tiger – was very important in Saka art and, until recently, was indigenous to Kazakhstan as the last Turanian tiger was killed in the reeds of lake Balkhash as late as the mid-20th century.[20] 19th century travellers and researchers such as A. Levshin, Ch. Valikhanov, N. Seversov and others have noted tigers in different regions of Kazakhstan. Writing in the mid-19th century, Chokan Valikhanov noted that the tiger was found on the Lepsy river in the Semirechye region and, according to his testimony, one day a tiger wounded the guard of the expedition camp.[21] In those days, Kazakhs often gave their children names of strong and dangerous animals. Along with the name '*zholbarys*', the tiger also has a poetic name: '*sher*' and the ancient Kazakh names Sherbay and Sherkhan derive from this. The wolf in everyday life is called '*kaskyr*', but the poetic name of this beast is '*buri*' and the personal name Buribai clearly reflects this. Admiration of the blessed wolf among medieval Turks[22] has its own prehistory, probably going back to the early Iron Age. The 18th century commander Kabanbay – famous for his part in numerous Dzungar campaigns – was named Erasyl at birth but, as a young man, he chanced upon a wild boar in a thicket boar and, when attacked, overcame it despite lacking any weapons. He thus received a new and honorable name of the predator he killed as the Kazakhs call a boar '*kaban*'. In general, in certain cases it was not permitted to call a child directly by the name of a predator, hence the modified names of Kabay or Kabash which go back to the name of the wild boar, and it is the same with the name of the wolf as the names Kushik and Kushikbay and Boltirik mean 'puppy', 'dog' and 'wolf cub' respectively. Here are the words of Makhambet Utemisov, warrior and poet of the 19th century: 'When Isatai was alive, we were like two wolves'.

The deer shown on the bone container are in an early style,[23] whereby the animals' legs appear either to hang down or stand as if on tiptoes: deer in this position are shown on the mirror of the early Saka period from Bukhtarma in eastern Kazakhstan.[24] The vortex sign is a special symbol found on many objects of the early style of the Tasmola culture, as well as other early Saka cultures in Kazakhstan.[25] This ornament is associated with the solar cult and highlights the topic of the eternal circle of life, change, sacrifice and reincarnation. The container can be dated to the 7th century BC. At the same time, it seems, it should belong to the period just prior to that of the construction of the Arzhan-2 kurgan in Tuva,[26] and the Taldy-2 kurgans in central Kazakhstan.[27] Other finds from the Saka kurgan of the Bayke-2 cemetery do not contradict a 7th century BC date. They are represented by a long bone pin with an elaborate decorated head, a whetstone, a bronze belt fastening, tanged trilobate arrowheads, a girth buckle and a number of vitreous paste beads (Figures 8–9). The bone pin was originally part of a headdress, rather than for hair, and closely resembles a gold example excavated at Arzhan-2 (Grave 5),[28] which once again illustrates the close connections between this part of Kazakhstan and Tuva.

Conclusion

The Saka kurgans of the Bayke-2 cemetery are not monuments of the elite but instead belong to the everyday population who, judging by finds across central Kazakhstan, formed the bulk of the population in Saka society, a sort of 'middle class' to use a modern term. Data from over 200 kurgans of the Tasmola culture have now been analysed and the majority of excavated burials belong to this group, including those of soldiers and privileged women. Saka 'Animal Style' objects made of metal, especially gold, are often found in large kurgans, where representatives of the 'upper class' – the clan chiefs – were buried. In this instance the bone container with the 'mysterious picture' discussed here was found in the kurgan of a 'middle class' individual, possibly that of a woman. This is a very simple object of everyday use which was carved from the bone of an unremarkable animal, yet its decoration was made by a skilled craftsman and is unique. The idea that 'Animal Style' and the so-called 'mysterious picture' was not a monopoly of higher-ranking classes of Saka tribes is very important. Instead, these concepts extended to

[18] Beisenov 2013*a*: 599, 660.
[19] Kisel 1994.
[20] Kazakhstan 2002: 22.
[21] Valikhanov 1984: 310.
[22] Lipets 1981.
[23] Bokovenko 2014.
[24] Savinov 2012: fig. 3.
[25] Beisenov *et al.* 2017.
[26] Chugunov, Parzinger and Nagler 2010.
[27] Beisenov 2013*a*.
[28] Chugunov, Parzinger and Nagler 2010: pls 55.1, 74.1.

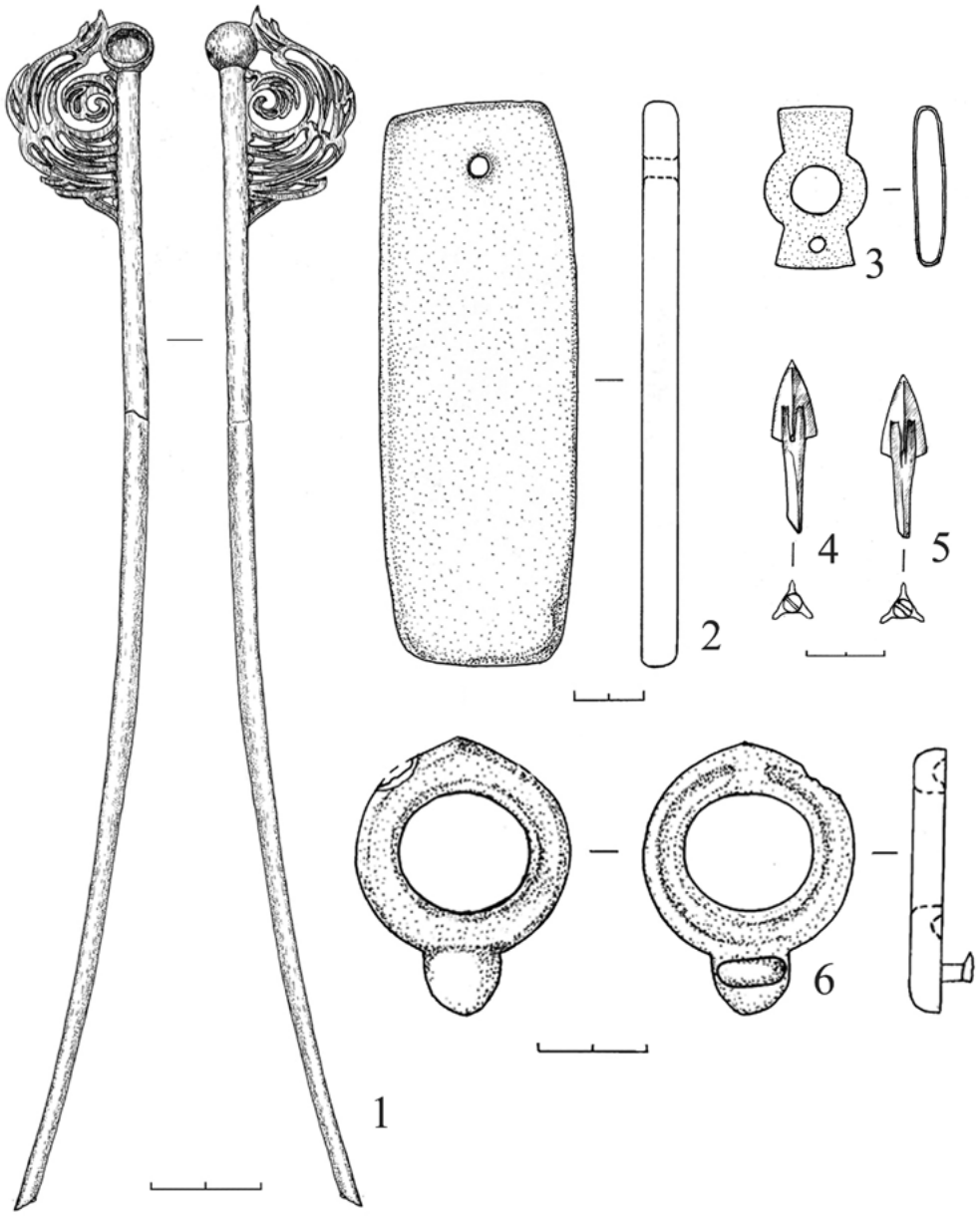

Figure 8. Other finds from Saka kurgans in the Bayke-2 cemetery: 1, bone pin, kurgan 3; 2, whetstone, kurgan 3; 3, bronze belt fastening, kurgan 8; 4–5, bronze tanged trilobate arrowheads, kurgan 8; 6, bronze girth buckle, kurgan 11

the whole of society, as might be expected of a non-stratified steppe tradition. Some of the stylistic aspects of the 'mysterious picture' on the container seem to be earlier than the techniques seen on items from Arzhan-2 and a number of synchronous monuments which are dated to the 7th century: we therefore conclude that this burial may date to the first half of the 7th century BC.

Figure 9. Vitreous paste beads from kurgan 3

A Scythian treasure in the lands of the Getae: considerations regarding the hoard of Stânceşti

Alexandru Berzovan[1]

Abstract

The present paper discusses a hoard of objects of Scythian tradition discovered during archaeological research at the two Getian forts of Stânceşti in Botoşani County, Romania. Although it has benefited from some discussions in the literature since its discovery, there are still a number of issues concerning the origin, function and chronology of these artifacts. The hoard consists of a large golden zoomorphic appliqué, two smaller gold appliqués, two bronze appliqués, two psalia made from bronze and silver alloy and an iron horse-bit. By analysing the objects in comparison with other products of the Eurasian 'Animal Style', we believe the hoard can be dated to around the mid-5th century BC and perhaps in its third quarter. It represents a testimony to the complex relations existing between the Scythians and the northern Thracian world.

Keywords: Iron Age; Scythians; Thracians; Getae; hoard; Stânceşti fort; Eurasian 'Animal Style'; zoomorphic appliqués

Introduction

The east Carpathian region represented throughout ancient history a contact and conflict zone between the local sedentary population and nomads who came periodically from the vast expanses of the Eurasian steppe. The same situation was also reproduced at the turn of the early and the late Iron Age when this area was at the crossroads between the Thracian, Scythian and Greek worlds represented by the cities founded on the shores of the Black Sea.

During this period between the 5th and 3rd centuries BC the culture of the Getae tribes, the northern branch of the Thracian people, flourished in the forest-steppes in the foothills of the Carpathian mountains.[2] The Getae built a large number of hillforts, some of which covered large areas and were protected by complex defensive systems (Figure 1).[3] These massive collective efforts were not just a simple response to the threat posed by seasonal raids of steppe nomads or the endemic internal conflicts but were also a consequence of economic, social and cultural developments which favoured the emergence of vigorous elites with a strong identity.[4] The large number of gold and silver hoards has led specialists to designate this period as the 'Golden Age' of the Getae.[5]

The relationship between the Getae and the Scythians, their eastern neighbours, was long and complicated. The genesis of the Getian culture in the east Carpathian region was more or less synchronous with the advance of the first Scythians towards the lower Danube.[6] Ancient written sources tell us about various interactions between these two groups and this is confirmed by archaeological finds which reveal a picture of two cultures in more or less permanent interaction.[7] The complexity of relations between the Getae and the fearsome riders of the steppes is very closely reflected in the discussions regarding the hoard composed of bronze, gold and iron objects discovered during the archaeological researches carried out in the two large fortresses of Stânceşti (Mihai Eminescu commune, Botosani County, Romania). The treasure represents a set of pieces of a certain Scythian tradition but which, in unknown historical circumstances, came to be buried in a Getian environment. Although it has benefited from some discussions in the literature,[8] there are still a

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[2] Nikulitse 1987: 83–125.

[3] Sîrbu and Trohani 1997; Zanoci 1998; Haheu 2008: 53–55; Florea 2011: 38–41.

[4] Florea 2011: 38–41.

[5] Sîrbu 2004: 39.

[6] Nikulitse 1987: 40–83; Tkaciuc 1994: 225–26; Arnăut 2003: 158–60; Bruyako 2005: 167–84; Măndescu 2010: 48–56; Levinschi 2005: 63–70.

[7] There is a large bibliography on this subject and for a general impression one should consult Melyukova 1969; 1979; Irimia 2005.

[8] Florescu and Rață 1969: 15; Păunescu *et al.* 1976: 176–77; Burda 1979: 67, 72; Gramatopol 1984: 27–28; Crişan 1986: 358; Nikulitse 1987: 127; Teodor 1999: 45; Sîrbu and Florea 1997: 82–83; Arnăut 2003: 124;

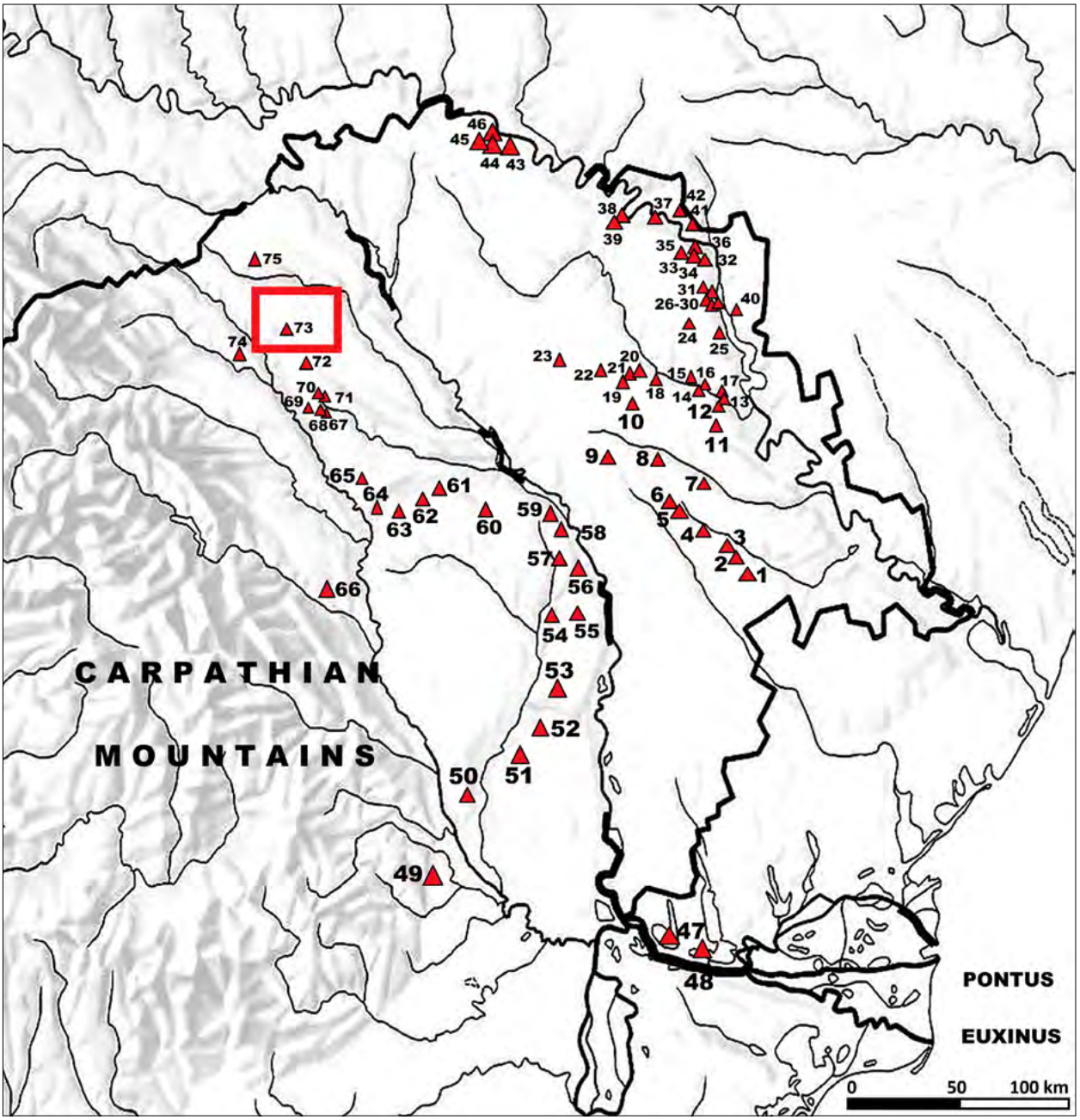

Figure 1. Getae forts in the east Carpathian area (5th–3rd centuries BC). Republic of Moldova: 1. Cârligeni; 2. Hansca – Toloaca; 3. Pojăreni; 4. Stolniceni; 5. Horodca Mare; 6. Horodca Mică; 7. Durlești; 8. Pănășești; 9. Horodiște; 10. Codreanca; 11. Hîrtopul Mare; 12. Măşcăuți; 13. Butuceni – Vest; 14. Potîrca; 15. Cot; 16. Scoc; 17. Selitra; 18. Isacova; 19. Tabăra; 20. Morozeni; 21. Dișcova; 22. Meleșeni; 23. Ghiliceni; 24. Cogîlniceni; 25. Horodiște; 26. Saharna – Hulboaca; 27. Saharna Mare; 28. Saharna Mică; 29. Saharna – La Revechin; 30. Rezina; 31. Țareuca; 32. Mateuți; 33. Glingeni – La Șanț; 34. Glingeni – Lacuri; 35. Parcani; 36. Curătura; 37. Japca; 38. Vertinjeni; 39. Temeleuți; 40. Ofatinți; 41. Caterinovca; 42. Rașcov; 43. Tătărăuca Nouă; 44. Rudi XI; 45. Rudi – La Șanțuri; 46. Rudi- Trei Cruci. Ukraine: 47. Orlovka- Cartal; 48. Novoseliskoe; Romania: 49. Cândești; 50. Brăhășești; 51. Măluşteni; 52. Fedești; 53. Vutcani; 54. Târzii; 55. Crețești; 56. Arsura; 57. Bunești – Averești; 58. Moșna; 59. Moșna; 60. Dobrovăț; 61. Mogoșești; 62. Țibana; 63. Poienile; 64. Oțeleni; 65. Crivești; 66. Dochia; 67. Cotnari; 68. Buhalnița; 69. Todirești; 70. Scobinți – Basaraba; 71. Scobinți – Dealul lui Vodă; 72. Cotu Copălău; 73. Stâncești; 74. Merești; 75. Ibănești (made by Alexandru Berzovan)

number of issues concerning the origin, function and chronology of these artifacts, problems which we have set out to clarify in this paper.

Florescu and Florescu 2005: 70–78; Teleagă 2016: 216, 243; Berzovan 2016: 49–59.

The 'twin forts' of Stâncești

The two forts of Stânceşti are located in the northern area of the Moldavian plateau, at the interfluve of the Siret and Prut rivers and standing some 40–50 m above

the surrounding area.[9] The hillside area, although lacking remarkable natural resources, offers favourable conditions for practising agriculture and judging by the analysis of the recovered faunal remains, the neighbouring regions were covered with large compact forests which offered abundant timber as well as hunting resources during the period when the forts were functioning. Archaeological research took place here from 1960 to 1970 and was carried out by a team led by the archaeologist Adrian C. Florescu. Less than 5% of the area of the two forts has been excavated. Unfortunately despite some confusion and gaps in the process of documentation of the finds, visible in the monograph[10] published 35 years after the end of the excavations, a number of valuable observations about the lives of those inhabiting the ancient enclosures can still be made.

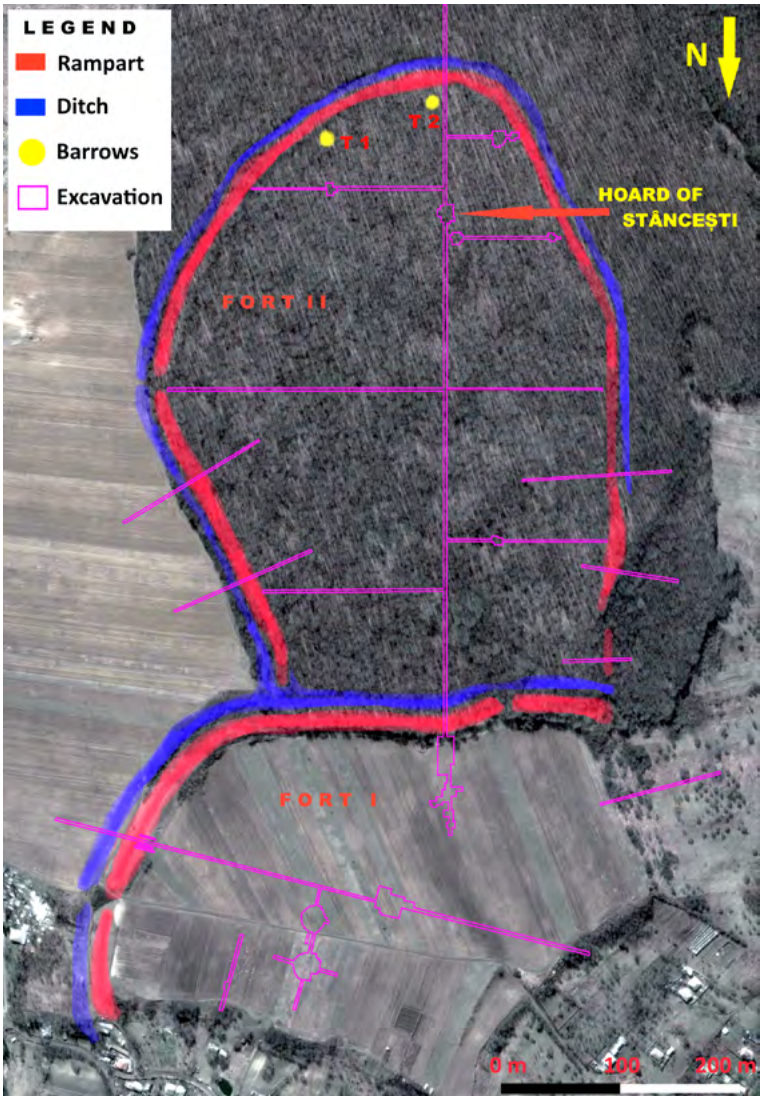

Figure 2. The twin forts of Stânceşti: general plan (drawn by Alexandru Berzovan)

Fort I has an area of approximately 22 hectares, and Fort II, attached to the first, approximately 23 hectares (Figure 2).[11] The defensive system was a simple one, specific to other contemporary fortifications, namely a wall of soil fixed in wooden frames and with a ditch in front. The eventual collapse of this wall led to the formation of the substantial earthwork which survives today (Figure 3).

It was determined, for example, that the two enclosures were permanently inhabited, even though the density of the dwelling complexes appears not to have been very large. We are not dealing with an organised proto-urban structure but instead with more or less disparate dwellings and the intervening spaces were probably used for agriculture. There are numerous hollows, as well as surface dwellings constructed of wood and clay. The main occupations of the inhabitants were those specific to a sedentary population: agriculture and cattle breeding. The large number of imported items, more often pottery and especially Greek amphorae but also glass beads, indicate a certain amount of trade and economic prosperity. Finds of weapons are not very numerous but there are a large number of Scythian-type bronze arrowheads which were also used by the Getian warriors.

According to the excavators,[12] there were three distinct stages of evolution in the lives of these forts: thus, Fort I was built in the first stage which probably dates between the 6th and 5th centuries BC. The second stage corresponds to the 4th century BC and marks the period of maximum development of the community. On this occasion, Fort II was also built. Subsequently, at the turn of the 4th to the 3rd centuries BC, Fort II was abandoned during what appears to have been a decline.[13] At the end of the 3rd century BC, with the arrival of the new Poienești – Lukașevka

[9] Nițu and Zaharia 1955: 333-334; Florescu and Rață 1969; Păunescu *et al.* 1976: 178; Șovan 2016: 290.
[10] Florescu and Florescu 2005.
[11] Șovan 2016: 290.
[12] Regarding this proposed chronology, some authors have made a number of objections (Măndescu 2010: 73; Bruyako 2014: 41) but until there is further archaeological investigation we should accept it as it is.
[13] Florescu and Florescu 2005: 22–24.

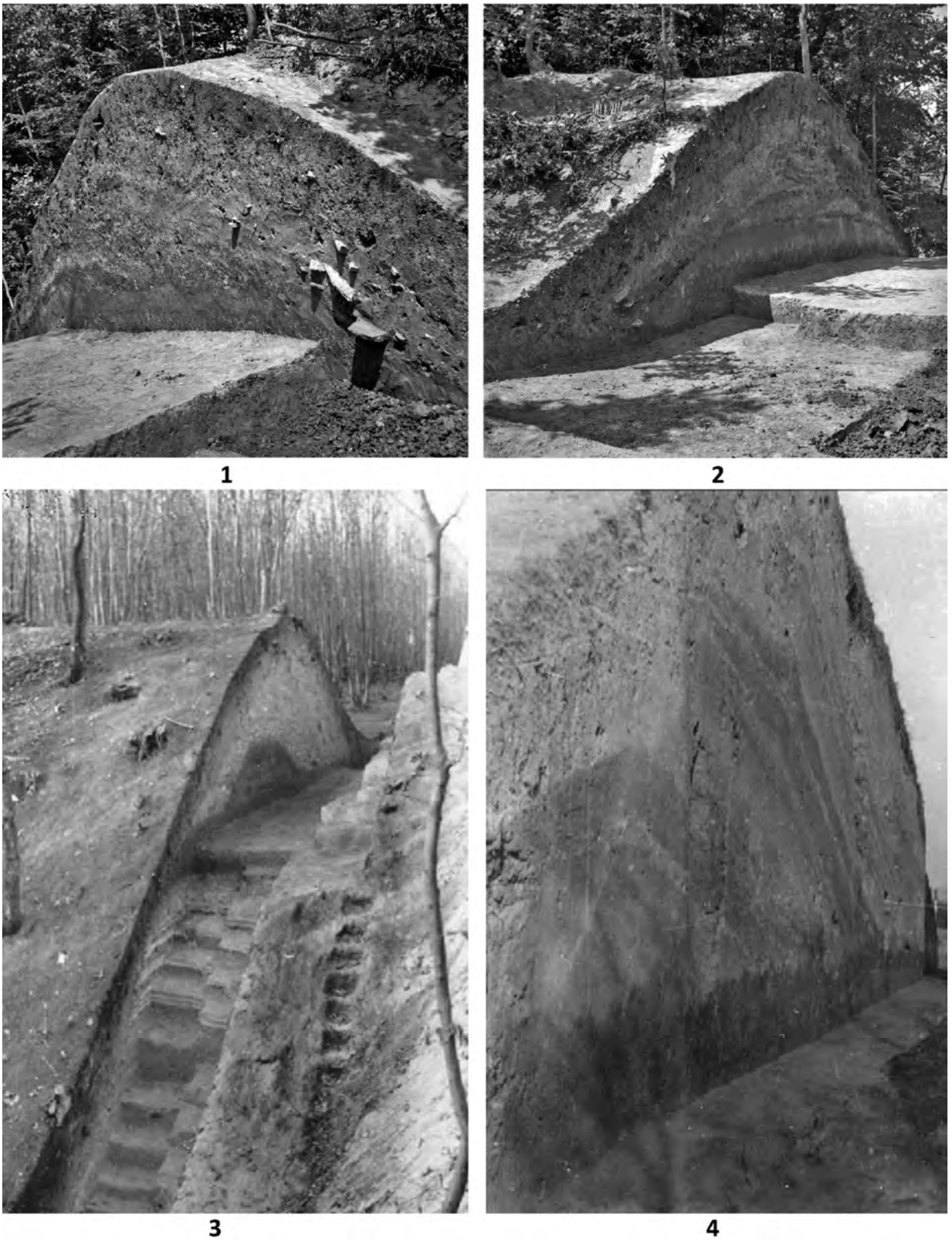

Figure 3. Ditches and ramparts of the Stânceşti forts (Botoşani County Museum Archive)

culture which is identified by most specialists with the historical warrior tribes of the Bastarnae,[14] Fort I was also completely abandoned and the history of the fortresses from Stânceşti ends. The 'Golden Age' of the Getae was reaching its end.

[14] See the discussion in Babeş 1993.

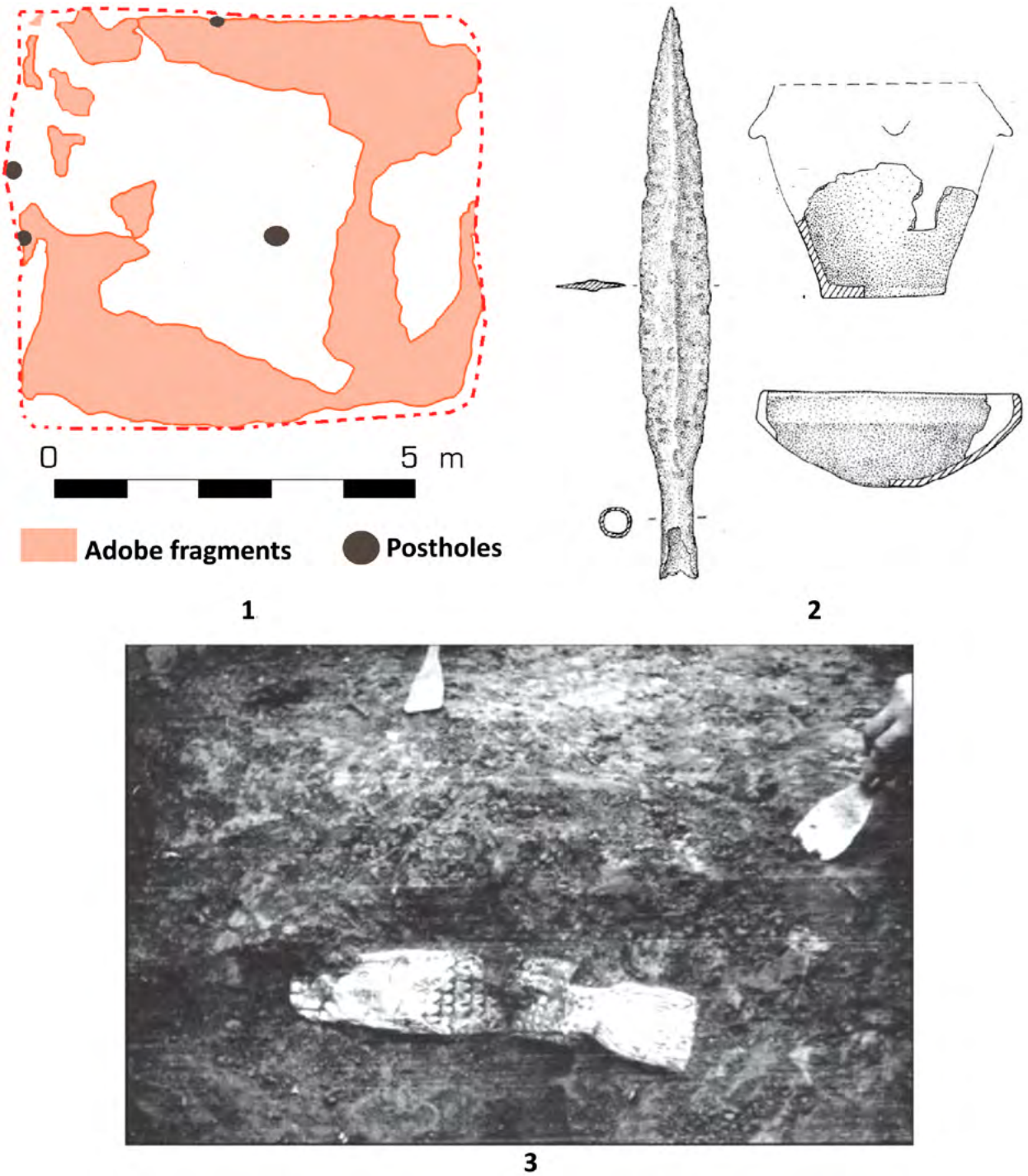

Figure 4. The context of discovery: 1, plan of dwelling no. 10 where the hoard was found (after Florescu and Florescu 2005); 2, part of the inventory of dwelling 10 (no scale, after Florescu and Florescu 2005); 3, the large golden appliqué during its removal (Botoşani County Museum Archive)

The archaeological context of the hoard

Surface dwelling 10, where the treasure was found, was discovered in Fort II, Section L1, at a distance of about 122 m south of the rampart. Like other surface dwellings in the two fortresses, dwelling 10 was built on a clay-covered wooden framework. Rectangular in shape, it measured about 6 x 7 m and it is possible, according to the excavators, to have contained two rooms (Figure 4.1).[15] The inventory (Figure 4.2), although not rich, is still representative.[16] It consists of a few pieces of pottery, an iron spearhead, two Scythian-type bronze arrowheads and a fragment of a bronze bangle.[17] The

[15] Florescu and Florescu 2005: 55.
[16] Unfortunately, due to the observed problems of the published monograph, we could not identify or reproduce in this paper the entire inventory of the dwelling.
[17] Florescu and Florescu 2005: 56.

hoard was found piled within an ordinary pot which had been buried in a hollow below the floor of the dwelling (Figures 4.3, 6.4). It was composed of eight artifacts: a gold appliqué, two smaller appliqués, two bronze appliqués, two *psalia* made of bronze and silver alloy and an iron horse-bit. We will present each of these in turn below.

Description of the artifacts

The zoomorphic appliqué (Figure 5.1) was carefully worked from a thin sheet of gold, probably by pressing on a wooden pattern. It had been used by attaching it to a support made of a more resistant material, possibly of wood, and secured by folding its edges around this backing. As regards the animal depicted, there are two opinions, the first being that it represents a fabulous animal with the head of a boar, the body of a fish and the tail of a bird but others interpret it as a peculiar type of fish.[18] As for the size of the piece, these are as follows: total length 478 mm, maximum width in the centre is 96 mm, and a weight of about 100 g.[19] Currently, the appliqué is stored in the collections of the National History Museum of Romania, Bucharest, with the inventory number 1817.

This piece has been scientifically analysed twice. The first was carried out by Axel Hartmann of the museum in Stuttgart and revealed a content of 59.3% gold, 40% silver, 0.70% copper and less than 0.01 bismuth traces.[20] The second analysis was carried out by Daniela Stan and Bogdan Constantinescu with similar results: 60.9% gold, 37.6% silver, 0.2% copper and 0.2% iron in the area of the eye, respectively 58.4% gold, 39.1% silver, 0.2% copper and 0.5% iron in the area of the tail.[21] This type of alloy containing a high amount of silver and known as electrum is specific to the Caucasus and eastern Anatolia.[22]

The two small golden appliqués are almost identical and were most likely designed to be used as a pair (Figure 5.2–3). They have an interesting elongated ovoid shape with a small peduncle. Similar to the large appliqué, these artifacts were made by pressing thin gold foil onto a wooden frame and secured by bending over the edges. The surface of the appliqués was decorated with regular and approximately parallel grooves which form a circular arc. The one preserved in its entirety presents 17 such semi-circular grooves (Figure 5.2). As for the size of the artifacts, the preserved one has a length of about 174 mm and a maximum width of about 75 mm.[23] We can safely assume that the damaged one was originally of similar if not identical size (Figure 5.3). A. Hartmann's metallographic analysis reveals a content of 64.49–69.49% gold, 30–5% silver, 0.51% copper and 0.01% bismuth. Analyses conducted by D. Stan and B. Constantinescu reveal 60% gold, 38.3% silver, 0.3% copper and 0.5% iron in the base area, 59.8% gold, 38.4% silver, 0.3% copper and 0.5% iron in the peak area, again pointing to a Caucasian or Anatolian origin.[24] The artifacts are currently stored at the National History Museum of Romania, Bucharest, with inventory number 1817.

The two bronze appliqués are almost equal in size: 274 mm in length measured 'on the string' and between 80 mm and 104 mm in width (Figure 5.4–5).[25] They have a shape reminiscent of tusks or horns. The curvature of their lower pointed parts are orientated to the left and right respectively, indicating that they were also most likely used as a pair. Regarding the clamping system, they present two parallel rows located on their top, consisting of seven holes each, at around 6 mm distance one from another. It is clear that the upper part of the two applications was fixed in this area on a support, while the lower curved part remained free. The pieces were ornamented by repoussé but their decoration is not entirely identical, leaving the impression of a rather careless execution which is in obvious contrast to that of the golden appliqués. So far, no metallographic analysis of these artifacts has been carried out.[26] The pieces are currently in the collection of the Botosani County Museum.

The two silver/bronze *psalia* belong to the 'S'-shaped type with two attachment holes, both ending in zoomorphic terminals which resemble heavily stylised birds of prey, probably vultures (Figure 6.1–2). As far as their manufacturing techniques are concerned, they were made by pouring molten metal into bivalve moulds but they lack any signs of later polishing. In regard to their size, they have a total length of 120 mm and a diameter of 8 to 14 mm. No metallographic analyses have been made of these artifacts. They remain in the building of the local administration of the Botoşani County Museum.

The iron horse-bit was made up of two bars bent at both ends, one of which is deteriorated on the inside and these two bars have slightly uneven lengths, 52 mm and 60 mm respectively (Figure 6.3).[27]

Analogies, function and chronology of the artifacts

The first piece to discuss is the large golden zoomorphic appliqué. Although we are dealing with a unique image,

[18] Haimovici 1992: 180; Sîrbu and Florea 1997: 82–83.
[19] Florescu and Florescu 2005: 70–71; Berzovan 2016: 50–51.
[20] See Hartmann 1978.
[21] Stan and Constantinescu 2014: 674, pl. 4.
[22] Stan and Constantinescu 2014: 674.
[23] Florescu and Florescu 2005: 71.
[24] Stan and Constantinescu 2014: 674, pl. 4.
[25] Florescu and Florescu 2005: 72.
[26] Berzovan 2016: 51.
[27] Florescu and Florescu 2005: 73.

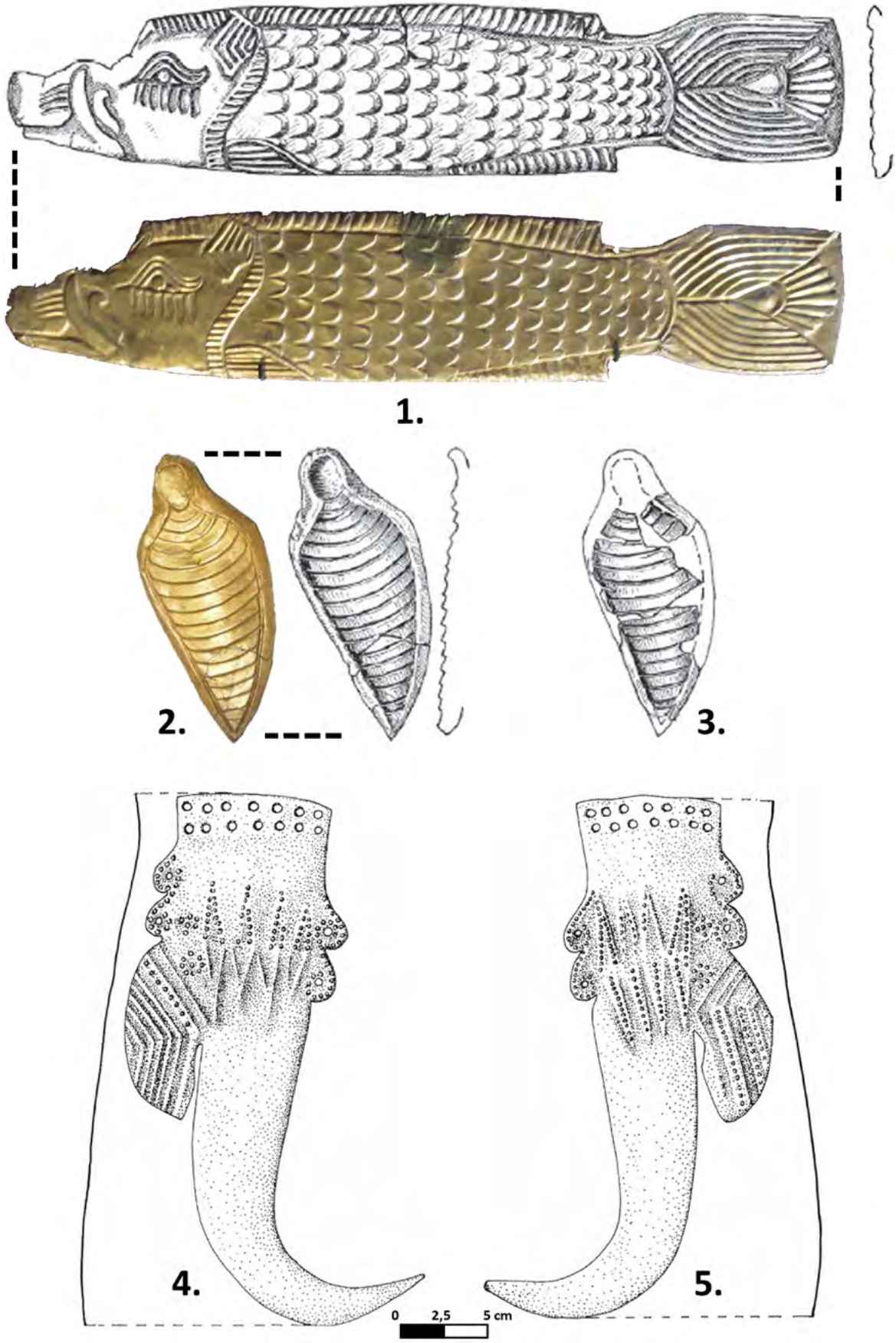

Figure 5. The hoard of Stânceşti: 1, the large golden zoomorphic appliqué (after Florescu and Florescu 2005); 2–3, the smaller golden appliqués (after Florescu and Florescu 2005); 4–5, bronze appliqués (after Florescu and Florescu 2005)

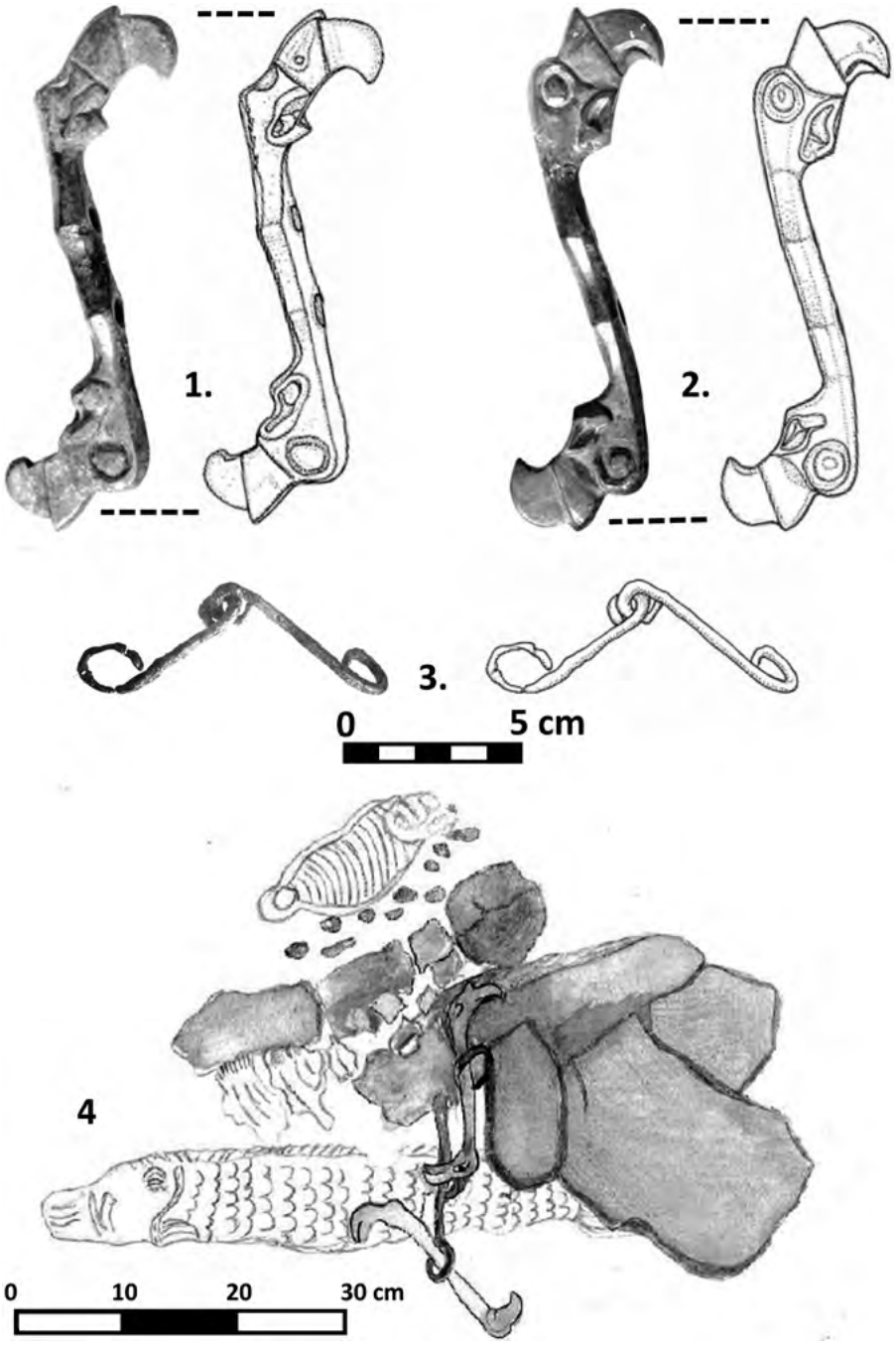

Figure 6. The hoard of Stânceşti: 1–2, bronze-silver *psalia* (after Florescu and Florescu 2005; drawings after Teleagă 2016); 3, iron horse-bit (after Florescu and Florescu 2005); 4, the hoard *in situ* (after Florescu and Florescu 2005)

as we shall further see, its individual elements have many analogies in the 'Animal Style' of Eurasia. The head of the Stânceşti creature has very good comparisons in wild boar representations of Scythian art, such as the appliqué discovered in the necropolis of Nymphaeion in Crimea (Figure 7.2),[28] the inventory of kurgan 4 of the 'Seven Brothers' group (Russian Federation),[29]a stray find from the Taman peninsula (Russian Federation) (Figure 7.3),[30] and another discovered in barrow 1 of Ulyap (Russian Federation).[31]

The resemblance between the head of the Stânceşti animal and that of the boar heads depicted on a gold vessel appliqué found in Baby (lower Dnieper, Ukraine)[32] is so clear (Figure 7.1) that the question arises as to whether we are dealing with the products of a single craftsman. In any case in the light of these comparisons, the interpretation suggested by S. Haimovici that the creature simply represents a peculiar kind of fish[33] can no longer be supported.

Numerous analogies also exist for the body of the fish. Fish-shaped appliqués are well known in the

[28] Kantorovich 2015: 540, 1535.
[29] Korovina 1957: 182, fig. 7.6; Kantorovich 2015: 540, 1535.
[30] Kantorovich 2015: 540, 1535.
[31] Schiltz 1994: fig. 351.
[32] Korolkova 2006: 235, table 9/12; Kantorovich 2015: 540, 1535/1.
[33] Haimovici 1992: 180.

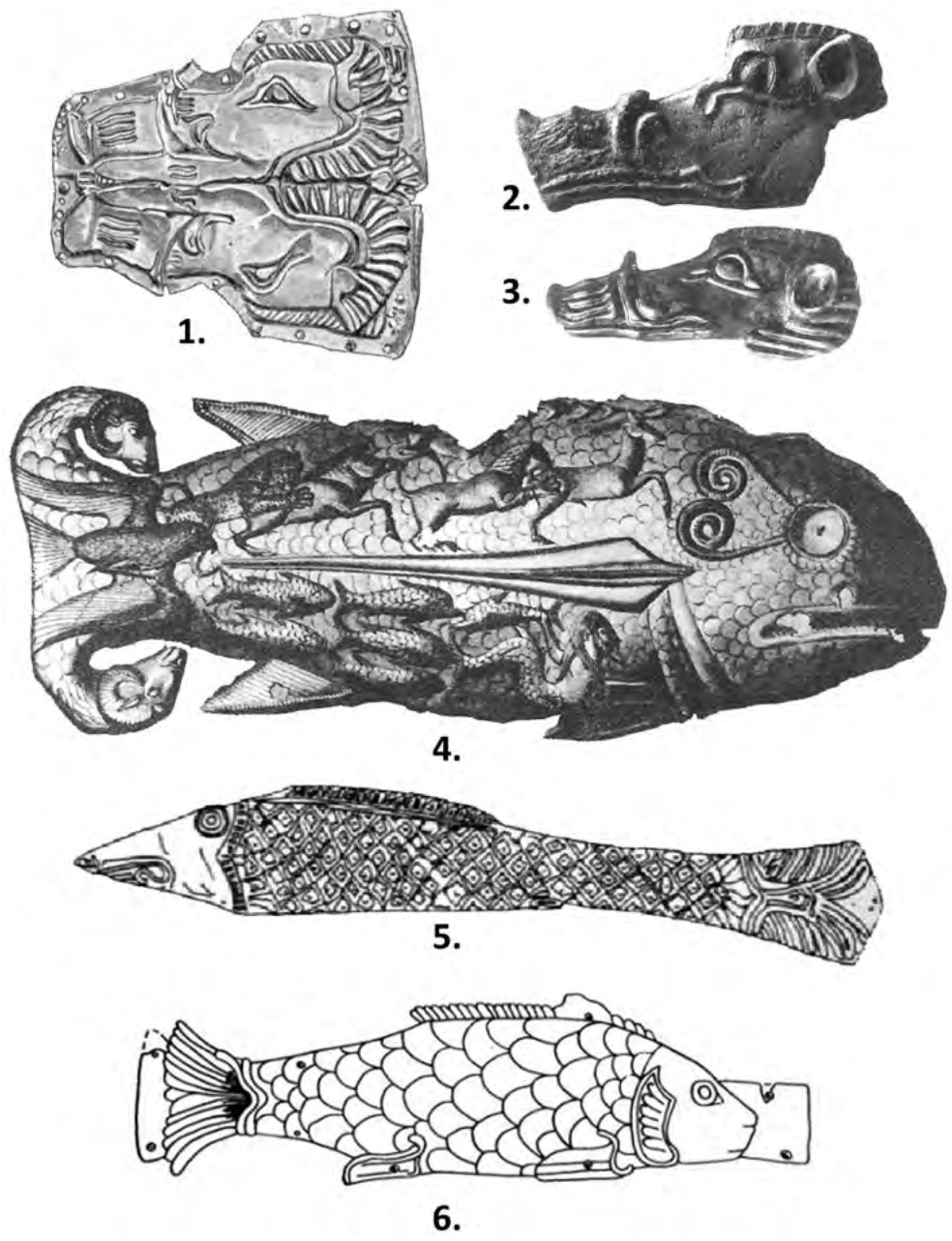

Figure 7. Boar and fish imagery in Scythian art (not to scale): 1, Baby; 2, Nymphaeum; 3, Taman Peninsula (after Kantorovich 2015); 4, Vettersfelde (after Bukowski 1977); 5, Volkovtsy (after Lebedynsky 2010); 6, Ordzhonikidze (after Chernenko 1968)

Scythian world: for instance the golden fish-shaped piece discovered at Witaszkowo (Vettersfelde) on the modern territory of Poland (Figure 7.4),[34] the appliqué found in the Volkovtsy tumulus (Ukraine) (Figure 7.5),[35] that from Ordzhonikidze (actual Pokrov in Ukraine) (Figure 7.6)[36] and many others. In the Thracian context, we may also note the golden fish appliqués discovered in the tomb of Duvanlij – Kukova Mogila (Bulgaria),[37] dated to the 5th century BC.[38] As for the identification of the fish species that was used as a source of inspiration for the body of the Stânceşti animal, C. Michel speculates that it could have been a sturgeon.[39]

In terms of its function, the zoomorphic appliqué from Stânceşti has been interpreted by numerous authors as a *prometopidion*,[40] and this opinion was apparently strengthened by the presence of other harness pieces within the hoard. The existence of a wooden support and a number of relative analogies[41] have

[34] Alexandrescu 1997: 683–84; Nebelsick 2015: 123–52.
[35] Ilinskaya 1968: 124; Bukowski 1977: 141; Lebedynsky 2010: 258; Kantorovich 2015: 857–58.
[36] Chernenko 1968: fig. 57; 2006: pl. 38; Korolkova 2006: 235, pl. 1.10; Kantorovich 2015: 857–58.
[37] Sîrbu and Trohani 2007: 207.
[38] Danov 1976: 146; Tonkova 2002: 277–79.
[39] Michel 1995: 35–47, 95, fig. 35, 62–68; Teleagă 2016: 243.
[40] Gramatopol 1984: 27–28; Kull 1997: 259; Măndescu 2010: 149; Florescu and Florescu 2005: 73; Trohani 2013: 67; more recently Teleagă 2016: 216.
[41] For example, the frontal appliqué of Solokha, depicting two fishes, has a length of 388 mm, and was applied in its turn on wooden frame: Jacobson 2005: 272.

also been cited in support of this. However, a closer examination reveals the problematic nature of these interpretations which have overlooked a fundamental aspect: the size of the object.[42] Moreover, no account was taken of the fact that from an artistic point of view all *prometopidia* are symmetrical in order to be viewed from the front and not from the side as in the present case. We therefore must look for other functions for the Stânceşti appliqué.

Studying the existing analogies offer some possible answers: for example, the fish-shaped gold artifact discovered at Witaszkowo (Vettersfelde) and measuring 410 mm in length, 100 mm in width and with a weight of 608.5 g,[43] was sometimes interpreted as a shield ornament.[44] Such an interpretation is certain for the pisciform decoration discovered at Ordzhonikidze as it was found *in situ* attached to the shield bars.[45] In the light of these observations, we believe that the interpretation of the large gold zoomorphic appliqué as shield decoration seems to be the most plausible[46] but whereas the Ordzhonikidze piece decorated a metal shield, the fabulous figure from Stânceşti might have been placed, together with its support, on a wooden or wicker variant.

These parallels also allow some chronological considerations. The tomb of Baby is dated between 470 and 450 BC, the one from Nymphaeion between 475 and 425 BC,[47] while that from Ordzhonikidze is dated to the third or fourth quarter of the 5th century BC.[48] These therefore support a mid-5th century BC.

The two smaller gold appliqués have many analogies among a large number of grave goods in the northern Pontic Scythian world, including the necropolis of Nymphaeum (Crimea),[49] the main tomb of Solokha kurgan (Ukraine),[50] kurgan 5 of Berestnyagy,[51] kurgan 14 of Raygorod (Ukraine),[52] Volkovtsy (Ukraine),[53] kurgan 66 of Bobritsa (Ukraine),[54] kurgan 459 of Turya (Ukraine),[55] and others.[56] However, unlike most of these pieces, the items from Stânceşti present a different gripping system. It is not easy to decipher the nature of the ornamental motif represented on these appliqués: it seems to be a combination of an animal's ears or a wing.[57] We cannot exclude an attempt to render a vegetal motif, possibly a leaf. The pieces were used as side harness appliqués. Their chronology span the 5th–4th centuries BC,[58] but more probably only the first half of the latter.[59]

Regarding the two bronze appliqués from Stânceşti, their interpretation is much more problematic as there are few comparisons.[60] Their relatively clumsy manufacture compared to the other objects from this treasure might suggest another origin, perhaps local. Some authors have interpreted them as greaves,[61] but this cannot be supported as their shape and size are inappropriate for such a function. It is quite tempting to interpret them as cheek-pieces of a helmet but the attachment system is completely atypical and we should be cautious of such an idea. In a recent study, Emilian Teleagă suggests that these two pieces instead represent the stylised horns of a mountain goat,[62] and were part of an elaborate horse mask with analogies both in the north Pontic Scythian world as well as in the distant Pazyryk culture.[63] This hypothesis is very tempting but if these items functioned as 'horns' for the horse, they should have been much better secured than their attachment system suggest. It seems to us that the two pieces rather represent 'tusks', perhaps those of a boar and possibly in connection with the representation on the large golden appliqué. They might have been mounted sideways on the horse head and fastened to the top, as it is shown by their attachment system, while their lower portion, 'the tusks', remained free.[64]

The two 'S'-shaped *psalia* with terminals in the form of birds of prey have close comparisons from Kurgan 2 in Pesochin (Ukraine)[65] and kurgan 24 of the Nymphaeum

[42] In the Scythian world, *prometopidia* evolve from simple triangular ornaments of rather small size, to large artifacts, having up to 300–400 mm in length (Ilinskaya 1968: 122). There are even larger items, such as the appliqué found at Bolshaya Tsimbalka, with a length of 414 mm (Jacobson 2005: figs 141–43), but all artifacts longer than 300 mm present a shape well adapted to the anatomy of a horse's head (Berzovan 2016: 51–52). If the golden appliqué of Stânceşti would have been mounted on the forehead of a horse, as it is supposed by some authors, that particular horse needed to have been of a completely unnatural size, even by today's standards. Besides that, the measurements made by zooarchaeologists show us rather modest sizes for horses in this historical period: see for example Bökönyi 1974; Haimovici 1983; Haimovici and Tarcan-Hrişcu 1996.

[43] Bukowski 1977: 134.

[44] Rieth 1971: 112; Bukowski 1977: 139–41; Polidovich and Malyuk 2016: 209. There are, however, some specialists that consider it to be an appliqué for a *gorytos*, for example Redfern 2000: 405–18.

[45] Chernenko 1968: fig. 57; 2006: pl. 38; Polidovich and Malyuk 2016: 209.

[46] For a longer discussion on the issue see Berzovan 2016.

[47] Kantorovich 2015: 539.

[48] Kantorovich 2015: 859.

[49] Kantorovich 2015: 1199.

[50] Kantorovich 2015: 576, 1200.

[51] Petrenko 1967: fig. 30.16.

[52] Petrenko 1967: fig. 30.17.

[53] Ilinskaya 1968: fig. 34; Kantorovich 2015: 1200.

[54] Petrenko 1967: fig. 30.15; Mogilov 2008: 50; Kantorovich 2015: 1200.

[55] Petrenko 1967: fig. 30.19,21.

[56] For a longer discussion regarding these types of appliqués see Kantorovich 2015: 574–76.

[57] Kantorovich 2015: 574–75.

[58] Kantorovich 2015: 576.

[59] Mogilov 2008: 50–51.

[60] In the monograph, a comparison is attempted between these two appliqués and a series of horn-shaped *psalia* found at Kazbag in the northern Caucasus (Florescu and Florescu 2005: 72). This comparison is unconvincing as the Kazbag artifacts do not resemble the Stânceşti bronze appliqués either in shape or size (Gertman 1972: fig. 1).

[61] Gramatopol 1984: 27–28; Sîrbu and Florea 1997: 82; Zanoci 1998: 84.

[62] Teleagă 2016: 235.

[63] Teleagă 2016: 250.

[64] Berzovan 2016: 54.

[65] Babenko 2005: fig. 4.5; Kantorovich 2015: 695.

necropolis (Crimea),[66] both dated to 475–425 BC.[67] The discoveries from Pesochin are of particular interest as the *psalia* were associated with a horse-bit almost identical to that found in the Stânceşti hoard. A very similar *psalium* was found in the north Thracian environment in tomb 1 of tumulus 15 from Tigveni (Romania),[68] and dated to the first half of the 5th century BC.[69] Furthermore, despite the enormous distance, we cannot ignore the analogies from the Pazyryk culture.[70] 'S'-shaped *psalia* with zoomorphic terminals other than birds of prey are better represented in the northern Pontic steppes: kurgan 1 near Aksyutintsy (Ukraine),[71] kurgan 3 near Stebliv (Ukraine),[72] kurgan 522 near Smila (Ukraine).[73]

The iron horse-bit raises far fewer problems in comparison with the other discussed artefacts, representing a simple and common type and another piece of the same type was also discovered in Stânceşti in Fort II[74] and similar discoveries are known from the Getian fort of Cotnari – Dealul Cătălina (Romania),[75] and from the 'princely' tomb of Găvani (Romania).[76] Such kinds of horse-bits have a wide distribution in the northern Pontic Scythian environment, for instance Kelermes kurgans 3 and 4 (Russian Federation)[77] and Aksyutintsy kurgans 4[78] and 440 (Ukraine).[79] They also appear in the Ciumbrud group identified by some authors with the historical Agathyrsi, for example in Grave 9 of Cristeşti (Romania).[80] Their chronology seems to be broad and spans the 5th and 4th centuries BC.

In the light of this discussion, a dating of the Stânceşti hoard to the middle of the 5th century BC seems quite plausible. If we take into account the good analogies in the necropolis at Nymphaeum, we could further refine its chronology to the third quarter of the 5th century BC. We believe that at the moment it is almost impossible to clarify this date more accurately.

Conclusions

There are many questions regarding the appearance of this 'Scythian' hoard within the forts of Stânceşti. During their life these artifacts, mostly made of good quality metal, represented objects of great value and prestige for whoever owned them. We can therefore suggest several possible scenarios for their appearance here although it is impossible to confirm and difficult to disprove any.

Firstly we could interpret the hoard as a gift or an offering. The exchanges between leaders of tribal factions, for various reasons such as winning favours, solving litigations and conflicts and consolidating matrimonial ties, were quite common in this period of history. The objects could have been produced locally by a travelling craftsman using raw materials brought from other areas. One cannot ignore that the 'Golden Princes' of the Getae were not at all unaccustomed to the refined artistic tastes of the steppe world. Alternatively, the artifacts could have been captured in the aftermath of a conflict, and taken by the victors back in their stronghold. Perhaps we are simply dealing with the outcome of some long-forgotten raid or a battle.

But there is another hypothesis: the hoard could be the result of an act of robbery made from a royal Scythian tomb. In this case we should draw attention to a significant detail, namely the lack of care with which the pieces were deposited as they were in fact piled up inside the pottery vessel, and even forcefully twisted which led to rupture and damage of the pieces (Figure 6.4). No matter how great was the danger at that time, no matter how dramatic the situation could have been, this negligence can hardly have been justified if the pieces had – beyond their strict value as precious metal – any symbolic meaning for the individual who decided to hide them.

The symbolism of the great golden appliqué remains equally difficult to decipher. We could look at Thracian art, especially that produced by the Getae. The wild boar's head could be interpreted as a symbol of the earth, the body of fish as water,[81] the bird tail as the air or heavens.[82] Such associations of bird, fish, boar or rabbit are quite common in Thraco-Getian art and are illustrated on the famous helmet from Detroit (Figure 8.3), the one of Peretu (Figure 8.2), on the goblets in the Metropolitan Museum of Art in New York, Agighiol (Romania) (Figure 8.3) and also the Rogozen treasure (Bulgaria) (Figure 8.1).[83] It is believed that this scene could be an allegorical representation of the supreme divinity of the Getae who ruled over all three realms.[84] In this case, the zoomorphic appliqué interpreted by us as a shield ornament could have had strong apotropaic purposes. The image of the bird of prey with the fish in its claws seems to have been a frequent iconographic

[66] Kantorovich 2015: 695.
[67] Kantorovich 2015: 695.
[68] Popescu and Vulpe 1982: fig. 18.f.
[69] Măndescu 2010: 163.
[70] Rudenko 1953: table XLIV/4, LVI/3, LXIV/6.
[71] Mogilov 2008: 206, fig. 197.11.
[72] Mogilov 2008: 206, fig. 195.12.
[73] Mogilov 2008: 206, fig. 195.10.
[74] Florescu and Florescu 2005: 76.
[75] Florescu and Florescu 2005: 76.
[76] Florescu and Florescu 2005: 76; Harţuche 1985: fig. 24.
[77] Mogilov 2008: 204, fig. 185.13.
[78] Mogilov 2008: 204, fig. 186.10.
[79] Mogilov 2008: 204, fig. 186.5.
[80] Vasiliev 1980: pl. 16.13.
[81] Or, generally speaking, of the underworld, like in the steppic world: see the discussion by Polidovich and Malyuk 2016: 213.
[82] Crişan 1986: 358.
[83] See Sîrbu and Trohani 2007.
[84] Crişan 1986: 358–59.

Figure 8. Vulture, fish and boar (or rabbit) in Getian and Scythian art (not to scale): 1, Rogozen: goblet; 2, Peretu: ceremonial helmet; 3, Detroit: ceremonial helmet; 4, Agighiol: goblet (after Sîrbu and Trohani 2007); 5, Maikop: appliqué (after Nebelsick 2012)

motif in the entire north Pontic environment and northern Caucasus during the 5th and 4th centuries BC.[85] We find it on an appliqué (Figure 8.5) from the Maikop hoard (Russian Federation),[86] one found in the Kul-Oba kurgan (Crimea),[87] another in Nymphaeum[88] and so on.[89] It also appears on some coins issued by the Greek colony of Histria (Romania), where the fish is no longer a fish but a dolphin.[90]

An examination of the mythology and beliefs of the ancient Iranian world is likely to provide other possible interpretations, albeit speculative. In Iranian mythology there is the mighty fish-like Kara, the guardian of Gaokerna, the 'Tree of Life',[91] on top of which sits the fabulous bird Saena.[92] The boar is a remarkable beast because of its ferocity. In Zend-Avesta, the wild boar is often associated with Verethragna,[93] the god of victory, therefore an animal with martial connotations.[94] The presence of the boar symbol on the objects therefore could indicate that they belonged to an individual with a high social status in the military hierarchy of nomadic Iranian groups.[95] Moreover, if the interpretation that we offered for the two bronze appliqués as 'tusks' is correct, then their purpose might have been to symbolically transfer the ferocious characteristics of the boar to the horse of the chieftain who originally

[85] Polidovich and Malyuk 2016: 212.
[86] Nebelsick 2012: 462.
[87] Polidovich and Malyuk 2016: 213.
[88] Polidovich and Malyuk 2016: 213.
[89] For an extensive list, see Polidovich and Malyuk 2016: 212–14.
[90] Sîrbu and Trohani 2007: 210.
[91] Moradi 2015: 247; Polidovich and Malyuk 2016: 214.
[92] Boyce 1989: 89.
[93] Babae and Mehrafarin 2014: 2755–56.
[94] See the discussion in Vertienko 2014*b*.
[95] Vertienko 2014*b*.

owned it. Finally, the heads of birds of prey, most likely vultures, betray a certain fascination with rapacious beasts: rapacity and ferocity represented traits or qualities necessary for survival in the harsh world of the steppe warriors who lived almost two and a half millennia ago.

Acknowledgements

We offer thanks to Denis Topal (University of High Anthropological School, Chișinău, Republic of Moldova) for some useful observations, as well as for assistance in obtaining some of the works quoted in the bibliography. We also thank Botoşani Museum Complex, especially Adela Kovacs and Daniel Ciucălău, for their kind support.

Interactions between mobile pastoralists and settled agricultural societies in central Asia: examples from the work of the Eurasia Department of the German Archaeological Institute (DAI)

Nikolaus Boroffka[1]

Abstract

Six projects from the work of the Eurasia Department of the German Archaeological Institute (DAI) are very briefly presented here in order to illustrate new data on the interaction between settled agricultural communities and mobile pastoralists in central Asia. Contacts between steppe pastoralists and urban societies extend at least as early as the 3rd millennium BC, well before the visible expansion of the Andronovo cultural community to the south during the 2nd millennium BC. The exchange of materials, technologies and ideas appears to have been peaceful and reciprocal. In both ways of life complex social structures may be observed, either as clearly delineated burial hierarchies or through strictly regulated settlement plans. During the 1st millennium BC the interactions between imperial Achaemenid Iran and the Scythian–Saka populations of the steppe have been discussed widely but attention here focuses instead on the complexity of steppe burial mounds and their function as sanctuaries and places of memory over long periods, and imports and specific architectural elements during the subsequent Hellenistic period show continuing interaction with the Greco-Bactrian kingdom. The evidence therefore shows that mobile steppe populations were always in contact with the sedentary agriculturalists further south and this was mostly peaceful co-existence. Both societies show high degrees of complexity, and may be considered to have interacted on an equal level.

Keywords: Central Asia; Bronze Age; Iron Age; Antiquity; mobile pastoralists; urban society; interaction

Introduction

The level of interaction between settled farmers and mobile pastoralists is an old topic which raises the fundamental question as to whether it was always peaceful or involved conflict. The earliest references go back to the dawn of mythological and historical accounts; the Biblical Old Testament account of the brothers Cain and Abel represents two contrasting ways of life which probably existed long before the Bronze Age: 'Abel was a keeper of sheep, but Cain was a tiller of the ground',[2] 'And Cain talked with Abel his brother: and it came to pass, when they were in the field, that Cain rose up against Abel his brother, and slew him'.[3] Remarkably it is Cain, tiller of the ground, who kills the shepherd Abel, and not the mobile pastoralist who kills the agriculturalist as the literature generally views mobile populations as dangerous as they are difficult to supervise and control by static administrations. This relationship continues to dominate much modern literature.[4]

Since its foundation in 1995, the Eurasia Department of the German Archaeological Institute (DAI) has been working on various projects in central Asia and Kazakhstan and several of these have contributed new data on the interaction between settled farmers and mobile stockbreeders,[5] even though not all projects had this as the principal objective. Overall, pastoralist society shows greater mobility, judging by the archaeological remains: communication and consequently the exchange of ideas and technologies appears to cover larger distances and occur rapidly. In addition, there are indications of social complexity and highly qualified technical know-how among these mobile peoples which give a different impression to ideas of 'primitive' nomads in previous literature. Most of the interactions with agrarian settled communities seem to have been peaceful, although historically we know of violent encounters as well. Half a dozen case-studies from the work of the DAI are discussed below as they illustrate these different aspects (Figure 1): they are presented in chronological order, followed by some concluding remarks.

Gonur depe (Turkmenistan)

The Bronze Age urban complex of Gonur depe is located on an ancient channel in the delta of the

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[2] Genesis 4,2.

[3] Genesis 4,8.

[4] From the many publications with different approaches, a selection of indicative works is given in chronological order of publication: Bell 1907; Fleure and Peake 1928; Nelson ed. 1973; Sherratt 1981; Khazanov 1984; Barfield 1989; Shishlina and Hiebert 1998; Khazanov and Wink eds 2001; Kohl 2002; Golden 2003; Peterson, Popova and Smith eds 2006; Szuchman ed. 2009; Honeychurch 2010; Kradin 2014.

[5] I here prefer to use this more correct and neutral translation of the Russian term 'кочевник' rather than 'nomad' used more frequently in western literature: the latter is an incorrect translation and has quite a different sense.

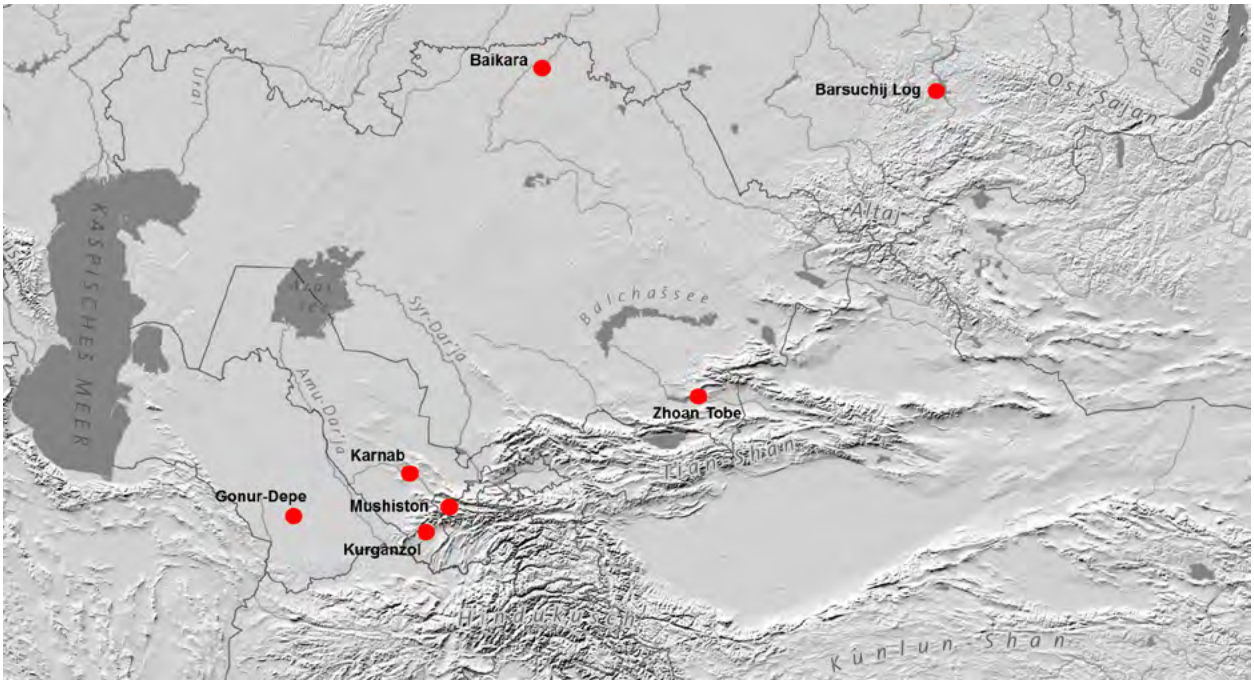

Figure 1. Map showing the location of the sites presented
(base map © DAI-Eurasien Abteilung with sites added by the author)

river Murghab, which flows northwards from central northern Afghanistan before ending in the sands of the Karakum desert in Turkmenistan.[6] This important site was discovered in the early 1970s by V.I. Sarianidi and has been excavated by the Turkmen-Russian Margiana Expedition since then, headed by V. Sarianidi until his death in 2013, and now by N. Dubova. In 2010 Sarianidi invited the Eurasia Department to take part in the research. The archaeological complex consists of a central city (Gonur North), which has a palace enclosed by a wall with interior corridor and rectangular towers (Figure 2). Exterior buildings follow this inner core and are surrounded by a second fortification wall which was also provided with rectangular towers. The city beyond includes additional buildings and is protected by an irregular oval outer wall which lacks exterior towers but has pillar-like buttresses around the interior. In some parts to the north and east, further buildings lie beyond this wall and these do not appear to have been enclosed by further protective structures. To the southwest lies a separate compact fortified structure with a parallelogram plan which is known as Gonur South ('the temenos'), and is slightly later than Gonur North. West of the city was an area with animal burials which were partly buried in complex funerary structures, and further west, on the opposite bank of the old course of the Murghab river, lay a large cemetery. The outer reaches of the city have been partly surveyed and several farmsteads or small villages identified either on the basis of sherd scatters or through excavation. These satellite sites continue to a distance of roughly seven to nine km from the city of Gonur North, and some are characterised as small fortified sites of around 30 x 30 m size. Further out from the city lies an extensive zone without any remains of settlement, hence these small fortified sites probably marked the limits of the actively occupied area of the oasis. The entire complex dates to the late 3rd and early 2nd millennium BC. It constitutes the most important excavated site of the Bactria-Margiana Archaeological Complex (BMAC), which extended from the Kopet Dag foothills in the west and through southern Uzbekistan to parts of Tajikistan in the east, and northern Afghanistan and northeast and eastern Iran to the south. All of the architecture is built from mudbricks, sometimes with complex installations such as fired clay water pipes below the floors or passing through the walls. Inside the city, as well as at the satellite sites, specialised craft quarters are partly recognisable, with pottery kilns (some of impressive size), metallurgical activities, and other structures probably connected with ritual practices.

In the western cemetery over 3000 burials have been excavated and these show a wide range of funerary structures, ranging from simple pits to complex brick-built tombs with several chambers. They contain various types and quantities of grave-goods, probably reflecting different levels of social status, and include pottery, weapons and personal adornments. The separate group of animal burials presumably had a different meaning which is difficult to interpret.

[6] For comprehensive overviews see Sarianidi 1990*a*; 1998; 2001; 2002; 2005; 2007; 2009; Rossi-Osmida ed. 2002, as well as the journal of the expedition: *Trudy Margianskoy Arkheologicheskoy Ekspeditsii* 1 (2004)–7 (2018), all with further bibliography.

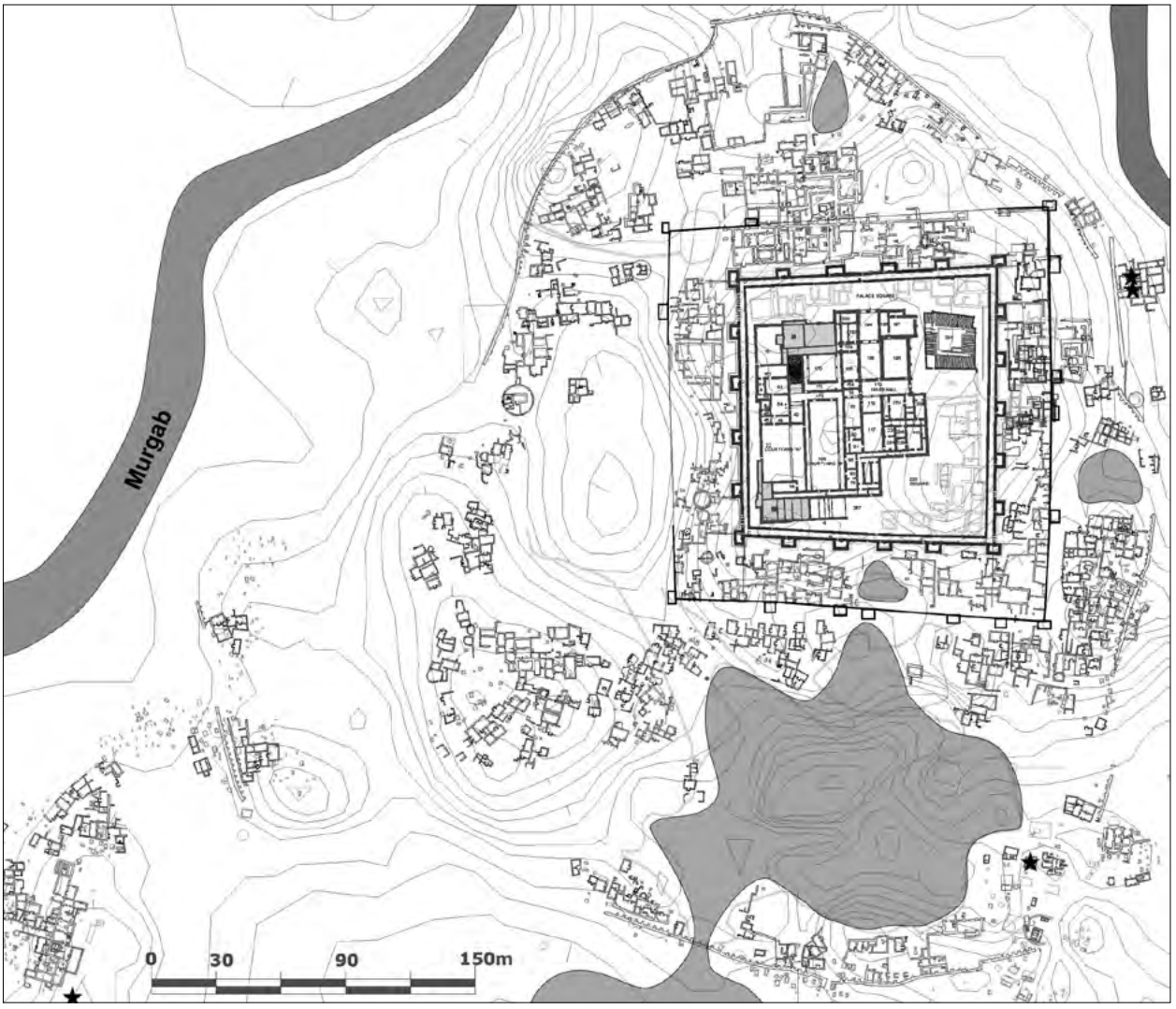

Figure 2. Plan of Gonur North: the grey areas mark the river Murghab and water basins, the locations of steppe pottery finds are marked by stars in the east, southeast and southwest and others lie outside the city area in satellite villages (drawing by R. and N. Boroffka, based on the topographic documentation by V. Artemiev and A. Urmanova)

Within the city a large number of burials has also been documented in niches and below floors, mostly belonging to children and young individuals, both groups who are under-represented in the main cemetery. Inside the southeastern part of the outer city wall, several large multi-roomed underground burial complexes were excavated, and these yielded exceptionally rich inventories, despite repeated looting in antiquity, and may be considered a 'royal cemetery'. The finds from here included vessels of silver and gold, and vehicles with massive wooden disc wheels with metal tyres which are comparable to those from the 'royal cemetery' at Ur.[7]

The material culture of the BMAC consist of large quantities of pottery, the overwhelming quantity of which was wheel-finished and uniformly fired in an oxidising atmosphere to produce a light beige or yellowish appearance. Some of the pottery is reddish where the surface has been compressed by burnishing and red paint was very occasionally applied to specific vessel types. The repertoire of shapes is highly varied, and clearly different vessel functions were well established. A large variety of personal ornaments, seal-amulets and tools have also been found, although weapons are rare with the exception of carefully crafted bifacial flint arrowheads.

From the burials, as well as the settlement sites, a number of objects have been found which prove long-distance contacts with other early urban civilisations in present-day Iran (e.g. pottery and cylinder seals) and Pakistan (e.g. seals, figurines, ivory dice and objects of glazed composition). Traces of the mobile steppe peoples are much rarer but so-called 'incised coarse ware' has been found in the outer city and at

[7] Cf. Woolley 1934.

satellite sites although not in the palace or inner city (Figures 2–3). This pottery has been considered to be part of the Andronovo cultural community,[8] but the revised earlier dating of Gonur depe makes this pottery somewhat older than that culture.[9] In fact the shapes and decoration, although present on Andronovo pottery, might as well belong to earlier phenomena of the steppe and forest-steppe.[10] Some recent analyses have shown that they were not made from local clay,[11] and the pots therefore must have been brought from other areas, probably far to the north. However, a slightly different situation appears to have existed just a few kilometres east of Gonur depe at the site of Ojakly.[12] This open-air site was studied by an American–Italian–Turkmen team and is best described as a settlement of mobile pastoralists of steppe origin, and a kiln proves local pottery production.[13] Chronologically this site overlaps with the final phases of the city of Gonur depe but continued later. The long-distance relations of Gonur depe are further underlined by analyses of the metal finds, as the main source of the ore was most likely central Iran, although ore deposits in Tajikistan and Uzbekistan were also used to a lesser extent.[14] In the desert delta fan of the Murghab we can thus observe an initial contact during the late 3rd millennium BC between mobile steppe peoples who brought their own pottery with them and lived, at least temporarily, in close contact with the sedentary agriculturalist city of Gonur depe, but left no traces within the central administrative and religious zones. During the course of the 2nd millennium BC mobile pastoralist settlements appear to have become more firmly established, and local clay was then used to meet their demand for pottery vessels. Intense exchange of goods and technology appears to have taken place in a peaceful co-existence.

Figure 3. Examples of steppe-type 'incised coarse ware' from Gonur depe: 1, sector 18, room 67; 2, sector 18, room 68; 3, satellite village Gonur depe 22 (photographs by the author)

Prehistoric mining in the Zeravshan valley (Tajikistan, Uzbekistan)

One of the first research projects of the Eurasia Department of the DAI in southern central Asia concerned the prehistoric exploitation of tin ore deposits and centred on two regions in Tajikistan (Mushiston and Takfon) and a macro-region in Uzbekistan (Karnab, Lapas, Changali). These areas differ considerably in their landscapes: Mushiston and Takfon lie at high altitudes (up to almost 3000 m above sea level) in the strong relief of the Hissar, Turkestan and Alay mountain ranges of Tajikistan, while Karnab, Lapas and Changali lie in a low steppe landscape near the Zirabulak mountains. Both belong to the southwestern branches of the Tian Shan. The ore geology also differs: the Tajik deposits are hydrothermal and polymetallic, and the ore at Mushiston is especially interesting as it has a combination of copper and tin minerals. The main components are harder green malachite ($Cu_2[(OH)_2|CO_3]$) and softer yellowish mushistonite ($CuSn(OH)_6$), a mineral named after this deposit. Although they can be sorted easily by optic differentiation, experimental smelting of unsorted ore produced a bronze with around 10% tin content.[15] The total ore content of this deposit is estimated at 70 million tons.

The ancient mining operations in Mushiston consist of irregular galleries (Figures 4–5), usually quite narrow but widened at the ore pockets and driven into the mountainside from the slopes. These galleries then follow the ore concentrations to a depth of at least 35 m but the full extent is unknown as they could not be followed further. Radiocarbon dates show two exploitation phases, the first between *c.* 2500–1700 BC and the second between *c.* 1700–1400 BC. The earlier of these can be connected with pottery of Andronovo type found inside the mines, and with traces of bone tools on the gallery walls, while the second may belong to people using pottery of late Andronovo tradition and very little BMAC pottery of the latest (Molali) phase, and were characterised by metal tool impressions on the rock.[16]

[8] Kozhin 2012.
[9] Zaitseva *et al.* 2008: the occasionally very wide range of dates and contexts are often problematic but more recent radiocarbon dates provide an overall date between 2300–2000 BC.
[10] See especially the Early Bronze Age material from Verkhnaya Alabuga (Potyomkin 1985: 148–200) or the pottery of the Poltava cultural community (e.g., Kachalova 1983), which would better fit the chronological frame of Gonur Depe. Similar material has also been found in the Mangystau district of the Ustyurt plateau in southwest Kazakhstan and north of the Kara-Bogaz-Gol (Samashev, Ermolaeva and Teplovodskaya 1999).
[11] Unpublished analyses from the Franco–German ROXIANA project 2012–2016, financed by ANR and DFG.
[12] Rouse and Cerasetti 2014.
[13] Rouse 2015; pers. comm.: I extend my thanks here too.
[14] Unpublished analyses from the Franco–German ROXIANA project 2012–2016, financed by ANR and DFG. For research on early mining and metallurgy in Iran see Vatandoust, Parzinger and Helwing eds 2011. For Tajikistan and Uzbekistan see Parzinger and Boroffka 2003; Sverchkov 2009; Garner 2013, each with further literature.
[15] Garner 2013: 113; pers. comm.
[16] Garner 2013.

Figure 4. Mushiston, Tajikistan: landscape with exploration trenches of the Soviet period which partly cut ancient mining galleries (© DAI-Eurasien Abteilung; photographs N. Boroffka)

Figure 5. Mushiston, Tajikistan: Bronze Age mining gallery with visible greenish and yellowish minerals of copper and tin (© Bergbaumuseum Bochum; photograph: J. Cierny)

The exploitation of the steppe in the Karnab–Lapas–Changali area is of a very different kind. The mineralisation formed around a granite intrusion into Devonian limestones. The ore here consists of very finely distributed cassiterite in quartz veins, especially rich in the contact zone between intrusive granite and surrounding limestone. Several of the opencasts in Karnab were excavated intensely, while Lapas and Changali were only surveyed and tested with smaller soundings. The opencasts at Karnab have the shape of long slits dug almost vertically into the ground (Figure 6), which closely follow the quartz veins of 0.4–1.2 m thickness. Large numbers of grooved stone hammers, often with heavy use-wear, were recovered, as well as handmade pottery of Andronovo type and the somewhat later Yaz I period which date to the second half of the 2nd millennium BC. The remaining quartz veins which were tested for ore revealed tin contents of up to 5.71%. Radiocarbon dates offer a chronology extending between about 1650–1300 BC, thus confirming the dating suggested by studies of the pottery.[17]

Roughly a kilometre from the opencasts a miner's settlement was excavated at Sichkonchi Say (Figure 7). The same types of grooved stone hammers used for ore-processing were found, plus numerous grinding stones with deep grooves which had been used to grind the ore, and smaller anvils with cup-marks. At this site pottery of the Andronovo–Tazabagyab group

[17] Garner 2013.

Figure 6. Karnab, Uzbekistan: mining shaft 3-3 before excavation (© Bergbaumuseum Bochum)

presumption that cassiterite may have been directly added to molten raw copper, hence the absence of slags. The settlement was most probably seasonal as the different cultural layers were separated by archaeologically sterile deposits of natural sediment. Five other structures with stone foundations were identified, which had been used repeatedly: these may be interpreted as workshop areas judging by the associated finds. It might be added that several of the open fireplaces which presumably mark the location of light housing, perhaps tents or yurts, which were repeatedly located in the same place, were separated by sterile layers, indicating that even light structures were reconstructed on the same spot each season. The arrangement of these light structures thus probably had a strictly established plan and implies a complex social structure with firm rules. Here too the radiocarbon range of 1880–1310 BC confirms the pottery chronology.[18]

This mining activity was aimed primarily at obtaining tin and only in the case of Mushiston was it probably specifically for bronze. In these excavations the pottery of mobile steppe peoples dominates, therefore presumably it was pastoralists who managed the ore extraction and processing. This is all the more

Figure 7. Karnab, Uzbekistan: general view of the mining settlement (© DAI-Eurasien Abteilung; photograph: author)

predominated, with some imports of Abashevo type and only a very small quantity belonging to the BMAC. Quartz flakes and blocks are remains of the cassiterite-bearing ores known from the nearby opencasts, and contained up to 9% tin. Small ovens with elevated tin content in the soil compared to the surrounding area were identified as smelting or alloying hearths, although no slags were found. A small arsenical copper bar-ingot and tin-bronze droplets allows the remarkable as settlements of sedentary and urban societies are not far away: for Mushiston, the settlement of Molali lies directly over a pass to the south and down a river valley, and from there it is not far to the large BMAC settlement of Dzharkutan, while the Yaz I settlement of Bandikhan–Maydatepa lies *en route*. More recent analyses indeed confirm that all

[18] Parzinger and Boroffka 2003.

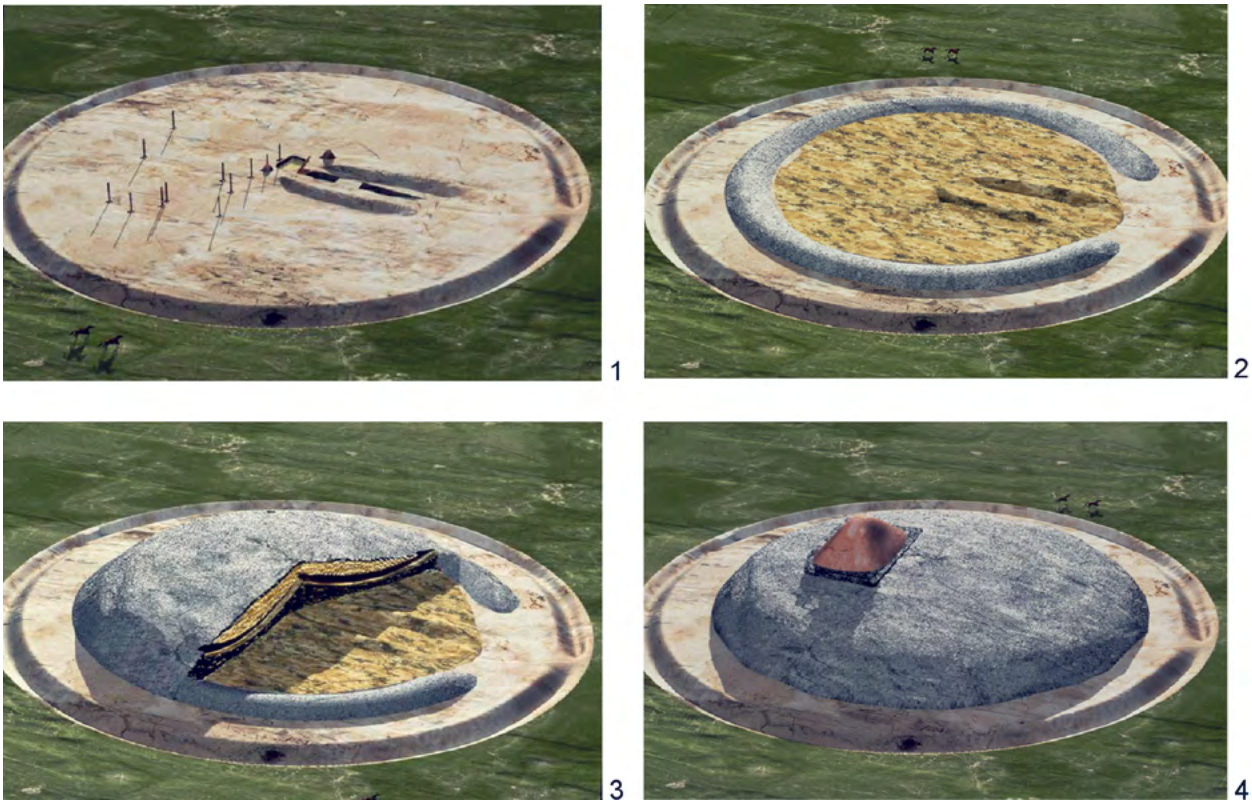

Figure 8. Baykara, Kazakhstan: virtual image of the main construction phases of the ritual building: 1, phase 1; 2, phase 2; 3, phase 3; 4, phase 4 (© DAI-Eurasien Abteilung)

three settlements made use of metal smelted from the ores at Mushiston.[19]

Moving further in time and space, some of the Iron Age monuments studied by the Eurasia Department of the German Archaeological Institute further north in Siberia are briefly discussed here but the 'royal' burial mound at Arzhan-2 is not presented as it is discussed separately by K.V. Chugunov.[20] In addition to that extraordinary discovery, the sites of Baykara, Barsuchiy Log and Zhoan Tobe provide new insights into various aspects of the life of mobile Eurasian pastoralists, and the latter also illustrates their contact with agricultural communities further south.

Baykara (Kazakhstan)

Excavated in 1997–1999, in collaboration with the North-Kazakh University in Petropavlovsk, the large kurgan of Baykara, near Sergeevka in northern Kazakhstan, lies at the northern edge of an extensive mound cemetery.[21] This particular mound was fairly well preserved, with a diameter of 85 m and a height of up to 7 m, although former robber trenches and pits marked the surface and the southeast part had been heavily damaged by mechanised excavators. On three sides the slopes of the mound were steep, but somewhat gentler on the fourth side. It proved to have a very complex construction, basically erected from wood, stone, turf and clay, and transpired not to be a burial mound at all, but rather some form of ritual building which had been constructed in four major phases, each accompanied by ritual activities (Figure 8).

In the first stage, roughly dated to the 5th–4th centuries BC, a circular ditch was excavated, the interior of which was cleared of the steppe grass surface to reveal clean clay. In the east/southeast a narrow bridge was left across the ditch in line with a ramp which led down into a tunnel-like passage. At the end of this were two steps which led back up to the surface. From the surface, beside the passage and near its end, were two pits containing cones of mixed fired reddish clay and sand. Southwest of the passage were several postholes but these did not allow the reconstruction of any clear plan: perhaps instead items of ritual or symbolic value had been suspended from these poles.

Phase two probably followed after a short period. The ramp and passage were closed, the posts removed and the entire inner surface covered with several layers of birch bark. The area was then enclosed by a stone wall with triangular section and access from the east/

[19] Unpublished analyses from the Franco–German ROXIANA project 2012–2016, financed by ANR and DFG.
[20] See also the monograph by Chugunov, Parzinger and Nagler *et al.* 2010.
[21] Parzinger *et al.* 2003.

southeast which corresponded with the bridge across the outer ditch. Soon after, further construction represents a third phase when the interior was filled with turf up to the upper edge of the stone wall which was in turn sealed by a clay layer with a stone cover which was level with the top of the enclosure wall. The resulting mound was not completely symmetrical as the east/southeast entrance through the stone wall had not been closed, thus access was possible over a gentler slope than on the other three sides which were now quite steep. Some hollows still existed in this mound: a larger one (destroyed by a later Sarmatian burial) above the former passage and two smaller passages from the north which led to the central hollow. They had been reinforced with beams and woven twigs, and the floors covered with birch bark.

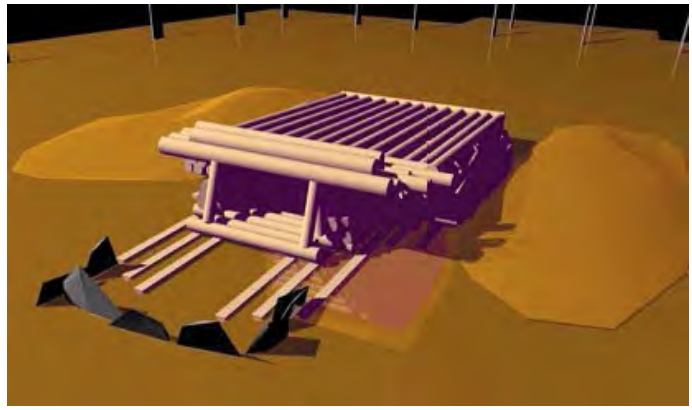

Figure 9. Barsuchiy Log, Russia: virtual image of construction phase 1c1 of the burial mound (© DAI-Eurasien Abteilung)

Figure 10. Barsuchiy Log, Russia: virtual image of construction phase 1c4 of the burial mound (© DAI-Eurasien Abteilung)

During phase four these hollows lost their function as they were deliberately collapsed by removing the interior supports and the resulting pits on the top filled with turf. The mound thus returned to its original shape with a higher and steeper western half. Directly west of the location of the former passage end (phase 1) and the main hollow (phase 3) a roughly rectangular stone platform was erected. On top of this was a structure built of mixed reddish fired clay and sand, which may be reconstructed as a large pyramidal shape corresponding to those from the pits of phase 1. The access always appears to have been from the southeast. It may be presumed that in front of, or in the vicinity, of the stone platform ritual actions were performed, but any such traces were largely destroyed by a later Sarmatian grave dating to the 2nd–1st century BC. This was the final use of this mound and belonged to the burial of an outstanding individual with some gold finds which survived despite ancient robbing. This grave was covered by further earth which gave the mound its final symmetrical appearance.

Barsuchiy Log (Russia)

During 2004–2006 archaeological excavations were carried out on the large kurgan of Barsuchiy Log, *c.* 50 km north of the Khakassian capital of Abakan.[22] This kurgan had already been robbed, hence it was not expected to find a well-preserved grave and the primary objectives instead were to document the construction and any associated ritual activities. Prior to excavation the originally pyramidal kurgan still stood to a height of 9 m high and was enclosed by a rectangular wall of horizontally arranged stone slabs intervening with vertical stone stelae and some of the latter showed pecked images. The length of the sides of the base measured *c.* 73–77 m. This funerary complex was, like many others, constructed in several stages during the 5th century BC (Figures 9–11).

During the first phase the outer stone enclosure was constructed and a pit for the main grave was probably dug too. These activities can be dated roughly to the 5th century BC, corresponding to the Saragash phase of the Tagar culture. The first act was setting up the vertical stelae in order to stake out the area of the later kurgan (phase 1a), followed by closing the intervening stretches with horizontal stone slabs (phase 1b). The enclosure wall was then built using a drystone technique to raise the wall on all four sides so that its final height far exceeded the large vertical uprights embedded in its core. An entrance on the eastern side was left open (phase 1c). Finally, earth was placed against the inner face of the drystone wall, probably to stabilise the corners of the stone

[22] Parzinger, Nagler and Gotlib 2010.

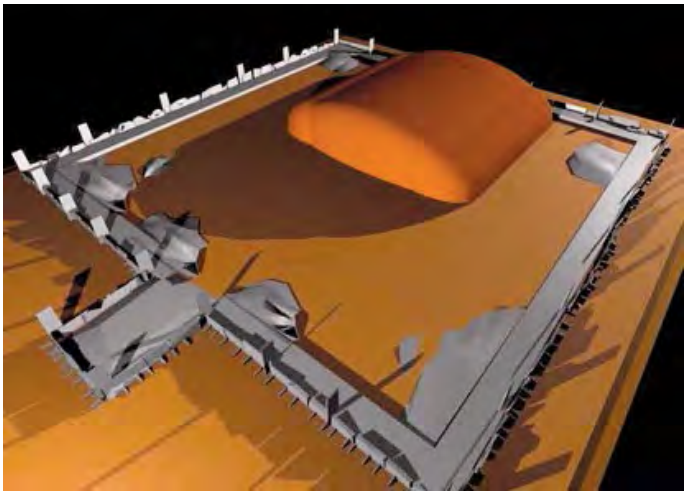

Figure 11. Barsuchiy Log, Russia: virtual image of construction phase 2b2 of the burial mound (© DAI-Eurasien Abteilung)

enclosure (phase 1d). During this time the eastern entrance was probably closed too. Most probably it was now that the principal burial chamber was built and used for burials. This chamber was constructed from massive larch beams and was entered from the west through a *dromos* built of similar beams (Figure 9). Burials seem to have taken place repeatedly, since at least four individuals were identified. The entire wooden structure was covered with large quantities of birch bark. The entrance in the west was closed after the last funeral and a funeral pyre was built on top, burning the carefully constructed wooden chamber beneath and collapsing into the pit (Figure 10). After the fire – or in order to quench it – clay was thrown onto the burning wood and it seems that the wooden structure was intentionally destroyed by the builders of the kurgan as part of a ritual.

During the second phase the inner surface of the funerary area was covered with turf and lumps of reddish-yellow clay to form a platform. It was probably at this stage that the dump from digging the burial pit was heightened and the interval closed with turf as well, thus forming a mound-like platform over the grave below (Figure 11). Some smaller installations were erected on the platform and finally a pyramidal mound was built from turf and covered with lumps of reddish-yellow clay. This entire complex is thought to have originally stood to a height of 11–12 m and must have been clearly visible as a shining red pyramid. Much later, during the 2nd–1st century BC, during the period of the Tes' culture, part of the mound was destroyed in the southwestern part and the burial reopened: the former chamber was demolished, the bones discarded and the head of a dog placed inside. This can hardly be called looting and the same phenomenon was observed at other sites, raising the question of why but strongly suggestive of deliberate profanation.

Zhoan Tobe (Kazakhstan)

The Semirechye region of southeast Kazakhstan is especially rich in burial mounds. Despite this, only the famous elite kurgan of Issyk containing the well-known 'Golden Man' has been excavated.[23] During survey work it was observed that many of the large burial mounds show different stone structures on the periphery or in the vicinity of the mound (Figure 12). In other regions, this periphery has often been destroyed by intensive agricultural work hence the cemetery site of Zhoan Tobe was selected in 2008 by the German–Kazakh team for the specific purpose of studying this feature. The site consists of three rows of kurgans with one rectangular kurgan in each. Only one of the large mounds, which had a diameter of 113 m and height of 11 m, still had a completely intact periphery.[24] Two kurgans were studied in more detail using geomagnetic survey and smallscale excavations. Most of the smaller structures turned out to be peripheral burials connected with the large mound. The most interesting aspect is that the entire area was surrounded by a stone pavement which can even be described as a ring-road: it was constructed from large stones lining both edges, a bed of medium-sized stones with smaller stones as paving (Figure 13). The entire paved area had a convex section and is the earliest illustration of road-building technology in central Asia. The pottery from one of the excavated burials included wheel-thrown bowls with T-shaped rims (Figure 14), a type known from Seleucid and Greco-Bactrian sites further south (see below) and permits the site to be dated to the late 4th or 3rd centuries BC.

Kurganzol (Uzbekistan)

In 2003 L.M. Sverchkov discovered the fortress of Kurganzol, which lies in the Baysun Basin of modern Surkhandarya province in southern Uzbekistan, roughly 100 km north of Termez and around one km southwest of the train station Baysun. It is located on a high spur of the southwest Hissar mountains at a height of 924 m above sea level. The cliffs on the southern side are several dozen metres high and are practically vertical, while the northern side is open to the comparatively even surface of the rocky spur which continues onto the plateau of the Baysun Basin.[25]

Systematic excavation began in 2004 and in 2008 the interior of the fortress was completely uncovered

[23] Akishev 1978; see also Baipakov, Voyakin and Zakharov 2016 for the extensive excavation and publication of a large cemetery without 'elite' burials.
[24] Nagler *et al.* 2010; Nagler 2013.
[25] Sverchkov 2007; 2008; 2013.

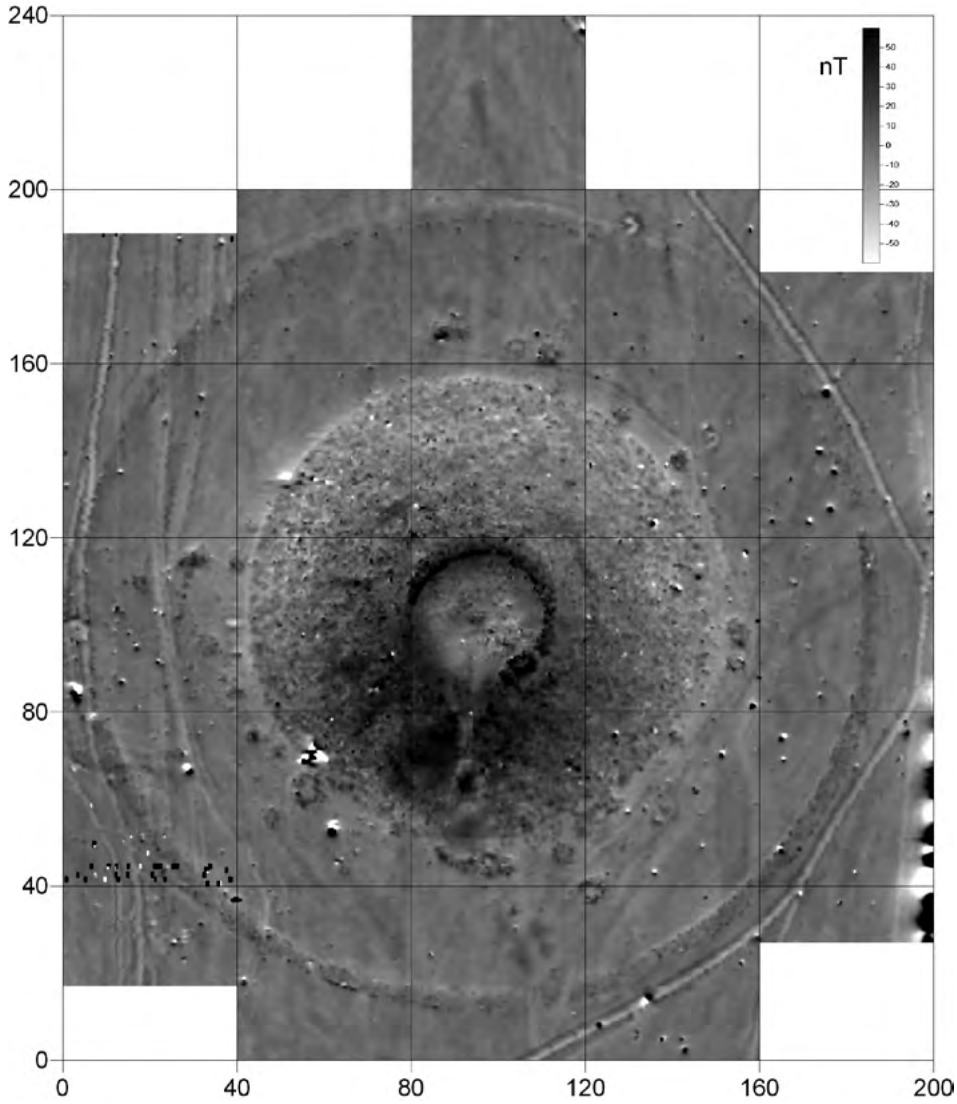

Figure 12. Zhoan Tobe, Kazakhstan: image of geomagnetic measurements on and around the burial mound (© DAI-Eurasien Abteilung; measurements J. Fassbinder and T. Gorka)

Figure 13. Zhoan Tobe, Kazakhstan: section through the stone-paved road around the burial mound (© DAI-Eurasien Abteilung; photograph: A. Nagler)

Figure 14. Zhoan Tobe, Kazakhstan: image of finds during excavation, wheel-thrown bowls with T-shaped rims (© DAI-Eurasien Abteilung; photograph: A. Nagler)

through the participation of the Eurasia Department of the DAI. It is circular in plan, measuring about 35 m in interior diameter, with fortification walls of 3–4 m thickness (partly preserved today to a height of over 2 m) and six circular towers on the northern and eastern sides as these were not protected by sheer cliffs (Figure 15). The towers were all accessible from the interior through narrow doorways. Arrow-shaped openings found in the wall were probably not loopholes but instead served for air circulation so that the mudbrick walls could dry properly: these slits were later closed up, presumably after the walls had dried completely. A single gate in the north gave access to the northern plateau and, separated by a ditch, to an unfortified village north of the fortress but which has been destroyed by modern agricultural activity.

Inside the walls were buildings placed around the interior circuit (Figures 16–17). Two lay on either side of the gate: there were three rooms to the left (east) as one entered, one with a cellar below, a narrow room to the west of the gate. This was followed by a three-roomed building which was composed of a large room ('dining room') with a smaller adjoining room which may be interpreted as a kitchen owing to its fireplace, storage pots dug into the floor and an interior 'window' connecting it to the large room, and a third room to the west. Immediately opposite the gate lay another large building which may have been the commander's quarters, with a store-house in the east in which rows of storage vessels had been dug into the ground along the walls, and two smaller rooms lay along its western side. The storage room had two large wooden posts

Figure 15. Kurganzol, Uzbekistan: landscape near the fortress of Kurganzol, located at the top of the spur in the centre of the image (© DAI-Eurasien Abteilung; photograph: author)

Figure 16. Kurganzol, Uzbekistan: panorama image of the interior fortress, looking north. The gate (not opened for conservation reasons) lies in the upper centre of the image (© DAI-Eurasien Abteilung; photograph: author)

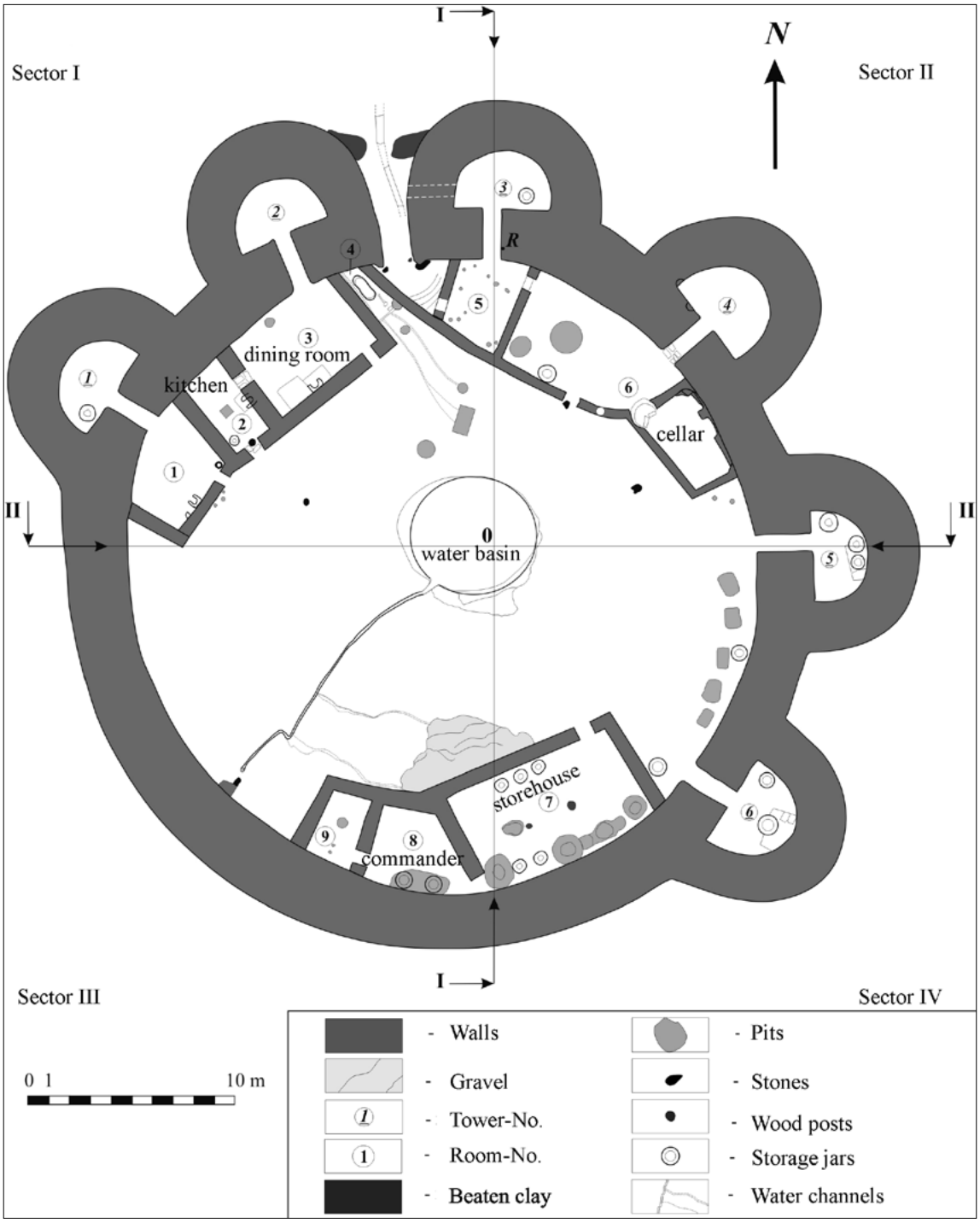

Figure 17. Kurganzol, Uzbekistan: plan of the fortress (base plan © L. Sverchkov, modified by the author)

Figure 18. Kurganzol, Uzbekistan: 1, 'fish-plates' of Greek-inspired shapes; 2, wheel-thrown bowls with T-shaped rims, comparable to those found in Zhoan Tobe and Issyk; 3, bowls of Greek-inspired shapes, left – wheel-thrown with black Hellenistic slip, centre – wheel-thrown simple pottery, right – handmade local imitation (© DAI-Eurasien Abteilung; photographs: author)

along the central axis which originally supported the roof. The centre of the large open courtyard was floored with gypsum plaster and contained a water basin, from which an overflow channel led under the fortification wall in the southwest and out to the cliffs beyond. This basin may have been filled either by a channel which ran from a spring several kilometres away, passing through the outer village and the fortress gate, or by rain and large transport jars.

The majority of finds from Kurganzol consists of pottery in Greek style (Figure 18). In addition to the large storage jars mentioned above, the repertoire includes smaller pots, jugs, bowls, plates and cups, including a variety of so-called 'fish-plates' and craters. These all reflect the variety of Greek shapes and all were thrown on the wheel. It is remarkable that no pottery of Persian tradition was found although the region was part of the Achaemenid empire before Alexander's campaigns but some coarser handmade vessels were found which imitated the new Greek forms (Figure 18.3). An unusual find, thus far unique in Hellenistic central Asia, is a clay 'bath-tub' discovered in the narrow room (4) directly west of the gate. Other remains include weaving equipment, some iron knives and iron forging slags which illustrate the routine work and self-sufficiency of soldiers. Stone sling-stones were the only weapons left behind by the garrison when it left the fortress, most probably during the early 3rd century BC.

Initial radiocarbon dates from burnt beams excavated in 2004 indicated that the site dated late in the 4th century BC. Dendrochronological analysis of one of the large posts from the storeroom provided a more precise date as its well-preserved bark and comparison with the tree-ring standard of western China determined it to have been felled in 329/328 BC, thus corresponding extraordinarily closely with the period of Alexander's campaigns and the reported construction of rear-guard fortresses.[26]

Analysis of flotation samples show that wheat and barley were planted, and wild pistachios and almond trees were also available. Juniper was used as building wood, and willows (possibly also used for basketry), poplars, tamarisks and ash also grew in the area, all indicating a more densely wooded environment, at least along the water-courses, than the bleak and almost treeless landscape seen today (Figure 15). The analysis

[26] Sverchkov 2013; for a recent discussion of ancient written sources on central Asia see Rapin 2018.

of the animal bones from the fortress shows that, in addition to herding sheep and goats, and keeping cattle and some pigs, the garrison also kept horses, donkeys, camels, chickens and domesticated dogs. The soldiers must have ventured into the surroundings as there was evidence for hunted gazelle, red deer, wild boar and hare, plus some bones belonging to onager, fox, buzzards, and a stork or raven. The presence of red deer and wild boars confirm the archaeobotanical evidence for a wetter climate and richer vegetation than now.

During the excavation the presence of coarse handmade pottery raised some questions. A likely explanation arose from the zooarchaeological analysis since some of the horses had been butchered and eaten.[27] This is very unusual for Greeks, but when viewed together with the local handmade pottery, recalls ancient written accounts that 'Scythian-Massagetae' mercenaries served in Alexander's army and suggest that the garrison at Kurganzol was in fact a mixed one of Greeks and 'local' stockbreeders.

Conclusion

First it may be concluded that contacts between settled farmers and mobile pastoralists in central Asia date at least as early as the late 3rd millennium BC:[28] the often invoked later southward movement of Andronovo communities was therefore probably not a major cause for the end of the BMAC as an urban or state-like society as often argued.[29] The contacts observed at Gonur depe, Ojakly and elsewhere instead indicate a peaceful co-existence, possibly making use of different and complementary ecological niches. There also appears to have been exchange of ideas and technologies: while the BMAC communities already had a long tradition of animal breeding as well as agriculture, we only see the first irrigation structures in the steppe region from the 2nd millennium BC onwards, for instance at Kokcha 15,[30] even if it is not clear whether this was due to influence from the south. Steppe sites located far from the settled agricultural centres appear to have produced metal objects of BMAC type,[31] although there are no indications that these were used by the mobile pastoralists themselves. More recently imports of wheel-thrown pottery of BMAC type have been published from several sites deep in the Kazakh steppe,[32] underlining the reciprocity of contacts. While the excavations at Kokcha 15 had already demonstrated irrigation systems, more recent research at the mining settlement of Karnab–Sichkonchi has, by documenting the repeatedly uniform structure of light housing placement, shown a strict internal structure. This indicates that there must have been complex social rules at the settlement even though it was only used seasonally. At the same time, we might remark that, just as in Mushiston high in the mountains, the mining and metallurgical activity was carried out exclusively by these mobile pastoralist communities who were evidently in close contact with nearby sedentary settlements even though they are scarcely visible in those urban centres.

During the Iron Age, contacts between steppe mobile pastoralists and settled agricultural communities located further south continued with the exchange of goods and ideas, as well as physical contacts.[33] In this context the Scythian–Saka world is often seen as less developed or complex, perhaps because archaeological information on large settlements and administrative centres is not available.[34] However, from the more recent research on kurgans we can now better document social stratification, witnessed for instance by the contrast in finds from the 'royal' burial at Arzhan-2 in Tuva[35] and the simple cemetery at Karatuma in Kazakhstan.[36] In particular, both Arzhan-2[37] and Barsuchiy Log show how the large mounds of the social elite were constructed over several stages or phases, even if we do not know precisely how long this process took. These monuments also functioned as territorial markers and memorials over long periods extending well beyond the life of a single generation, thus illustrating complex and lasting traditions. On excavation, the large mound at Baykara turned out not to be a burial site at all, but rather the material expression of a long and highly developed ritual construction process which created a highly visible red pyramid raised on a platform as a final sacred structure and memorial. An analogy to this perhaps may be observed in the last stage of Barsuchiy Log, which again resembled a large red pyramid in its final state even though it was originally conceived as a place of burial. However, these two examples are

[27] Benecke 2013.

[28] Earlier periods have not been considered here, but most probably such contacts extend to the very beginnings of settled agriculture in the early Neolithic period.

[29] A balanced overview is expressed by Luneau 2017.

[30] A complex system of irrigation channels and plots of land has been published by Itina (1977).

[31] At the site of Liavliakan 506 in the Kyzyl-Kum desert of southern Uzbekistan, the finds include pottery described as of 'steppe' type and two brownish sandstone moulds (Vinogradov and Kuzmina 1970; Chernykh 1992: 182): one is for an axe-adze (Boroffka 2009: 253–54, fig. 6.3a–c) while the other is for a shaft-hole axe of 'Bactrian' type (see Kaniuth 2006: 93–95, type E-2, with further literature), and neither is otherwise known from 'steppe' contexts.

[32] Varfolomeev 2013; Khabdulina *et al.* 2017.

[33] The reciprocal relationship of Achaemenid and Scytho–Saka art has often been discussed: of the large number of publications we might cite Lang 2012 and the contributions in Treister and Yablonsky eds 2012, each with extensive bibliographies; see also Francfort, this volume.

[34] Especially fortified sites, among them the well-known site of Belsk', but many smaller ones are also known from the hinterland north of the Black Sea (e.g., Suprunenko *et al.* 2016; Bilinsky 2018), while the state of research in central Asia hardly provides any information.

[35] Chugunov, Parzinger and Nagler *et al.* 2010.

[36] Baipakov, Voyakin and Zakharov 2016.

[37] See the contribution by Chugunov, this volume.

hardly sufficient to consider such red pyramids as standardised symbols and only future research and a broader database may help here.

The somewhat later mound of Zhoan Tobe is remarkable as it is surrounded by a road. Similar features associated with burial mounds are known from other sites,[38] but have rarely been studied in their own right. In this case the road is most likely ritually symbolic rather than functional since it is circular and does not lead anywhere except around the mound, but is surprisingly modern in its construction: the foundation is of large boulders with stone curbs on each side and a fine compact gravel on the convex surface. Similar road construction may have existed in the Achaemenid empire and was standard procedure in the Roman empire,[39] but in Europe this knowledge was lost and only re-introduced during the Industrial Revolution in the late 18th century.[40] The application of such advanced road-building technology deep in the steppe is quite remarkable, even if apparently only for ritual purposes. Whether this was an original development of the steppe population, or the result of external influence from the Achaemenid or Greek worlds remains open but it should be noted that the builders of Zhoan Tobe, just like the contemporary individual buried in the Issyk kurgan, had contacts with the Greco-Bactrian world judging by the imported pottery bowls found in each of these kurgans.

The bowls found at Zhoan Tobe and Issyk give a date *ante quem non*, and have very close parallels among the late 4th century BC vessels from Kurganzol. This shape continued to be used in central Asia at least until the Seleucid period,[41] but it is improbable that these kurgans can be dated so late. The fortress of Kurganzol also documents another aspect of interaction between mobile pastoralists and urban society. The handmade pottery, and especially the results of the zooarchaeological analysis, indicate the presence of a mixed garrison, including Greeks and Massagetae (if we follow the ancient sources for ethnic identification), both fighting against local tribes. The steppe peoples here appear to have divided between those who accepted the new rulers and were integrated into their social system, and others who continued to resist: they illustrate how the steppe was not a unified ethnic or cultural world. It is again from ancient written sources that we hear of the Yuezhi, a pastoralist people who attacked the Greco-Bactrian kingdom in the 2nd century BC and eventually caused its collapse.[42] There is no agreement as yet on their archaeological identification but after centuries the great kurgan at Barsuchiy Log was ravaged and desecrated during the period of the Tes' culture of the 2nd–1st century BC. This illustrates a radical change of culture and ideology within the steppe communities, and indicates a period of turmoil with conflict between the settled urban society and the mobile pastoralists, as well as among the steppe tribes themselves.

Despite this, the archaeological evidence generally indicates peaceful interaction between these two societies with their differing economies and lifestyles and, rather than conflicting, they complement each other and appear to have comparable levels of social complexity. This impression contradicts many of the written sources which instead focus unduly on the periods of conflict, much like our modern news.

[38] See Parzinger, Gass and Fassbinder 2017.
[39] E.g., Young 1956.
[40] The engineers generally credited with the (re-)introduction of such road-building knowledge are John Metcalf (1717–1810) in Britain and Pierre Marie-Jérôme Trésaguet (1716–1796) in France: Hallas 2004; Bruce 1934.
[41] E.g., Lyonnet 2013.
[42] E.g., Lyonnet 1991.

The Arzhan-2 'royal' funerary-commemorative complex: stages of function and internal chronology

Konstantin V. Chugunov[1]

Abstract

This paper is devoted to the stages of the construction and functioning of the Arzhan-2 funerary-commemorative complex in Tuva explored by a Russian-German expedition between 2000 and 2004. On the basis of the remains of the above-ground structures, burials, stratigraphic and observations, full area excavations and dendrochronological data it became clear that the complex, as a whole, was discrete and had an internal chronology. In order to determine the dates of the individual sub-complexes, an analysis of the classification of arrowheads from Arzhan-2 was carried out and this was confirmed by an analysis of knives and other objects. As a result, several trends in the evolution of arrowheads were identified and this made it possible to determine the sequence of the sub-complexes, including lesser graves. The identification of the trends of development and transformation of shapes of various categories of artefacts is very promising as it may lead in the future to the establishment of a separate relative chronology of cultures of the early Scythian period in Asia. Parallels and analogies of materials from this exclusive Tuvan barrow found in monuments in neighbouring and remote regions show that the synchronicity of antiquities from southern Siberia, central and middle Asia and other territories remains to be resolved and precisely dated complexes such as Arzhan-2 may help in the resolution of this problem.

Keywords: Arzhan-2; area excavation; stratigraphy; chronology; arrowheads

Introduction

The Arzhan-2 funerary commemorative complex in the north of the Republic of Tuva, excavated between 2000 and 2004 by a Russian-German expedition, is well known to specialists as a result of its excellent state of preservation, the number of finds and their reliable dating by scientific methods.[2] The excavated material allow us to consider this complex as a reliable indicator of the cultural and historical processes in eastern Eurasia in the early Scythian period. In this connection the sequence of phases of the funeral ritual examined in this article is very important for an understanding of the internal chronology of Arzhan-2 and makes it possible to define more precisely the relative sequence of the individual sub-complexes explored in the monument.

As a result of five years of research it became clear that, despite the attempts to rob the barrow in ancient times and later destructions, almost all the burials directly connected with the complex remained undisturbed. This is largely down to the unique spatial layout of Arzhan-2 (Figures 1–2). Within the limits of the funerary-commemorative complex, a total of 12 graves containing 18 bodies were studied, as well as the burials of 14 horses and harness decoration. Other artefacts found were several 'deer' stones, slabs with petroglyphs and four votive hoards containing items of harness and armaments. The ritual buildings around the periphery of the barrow were studied, as was the so-called northern complex – a pit to the north of Arzhan-2 with individual bones of 12 people and horses. These additional sub-complexes, linked by a single space, yielded hundreds of artefacts, not to mention thousands of beads. All this material shows that Arzhan-2 was a 'royal' barrow of the Aldy-Bel culture in Tuva.[3]

The stratigraphy of the barrow's above-ground structure is fixed at full height by two sections passing through the entire barrow, with nine additional radial and nine auxiliary and frontal sections. In five years of excavations around half a kilometre of sections were drawn. This documentation makes it possible to obtain a full impression of the monument's architecture and to reconstruct its original appearance at various stages of its use as a funerary-memorial complex.

At first glance the barrow's above-ground structure is fairly monotonous: it consists of slabs of fine-grained Devonian sandstone of a reddish-brown colour and layers of clay in its upper and, in places, lower part (Figure 3). The sources of the raw material used by the ancient builders have been determined: the slabs came from a quarry two km northeast of the barrow on the slope of the Kara-Org ridge. It is highly probable that

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[2] Chugunov, Parzinger and Nagler *et al.* 2010; Alexeev *et al.* 2005: 84–88, 134–36; Zaitseva *et al.* 2010.

[3] Chugunov 2010: 163–66.

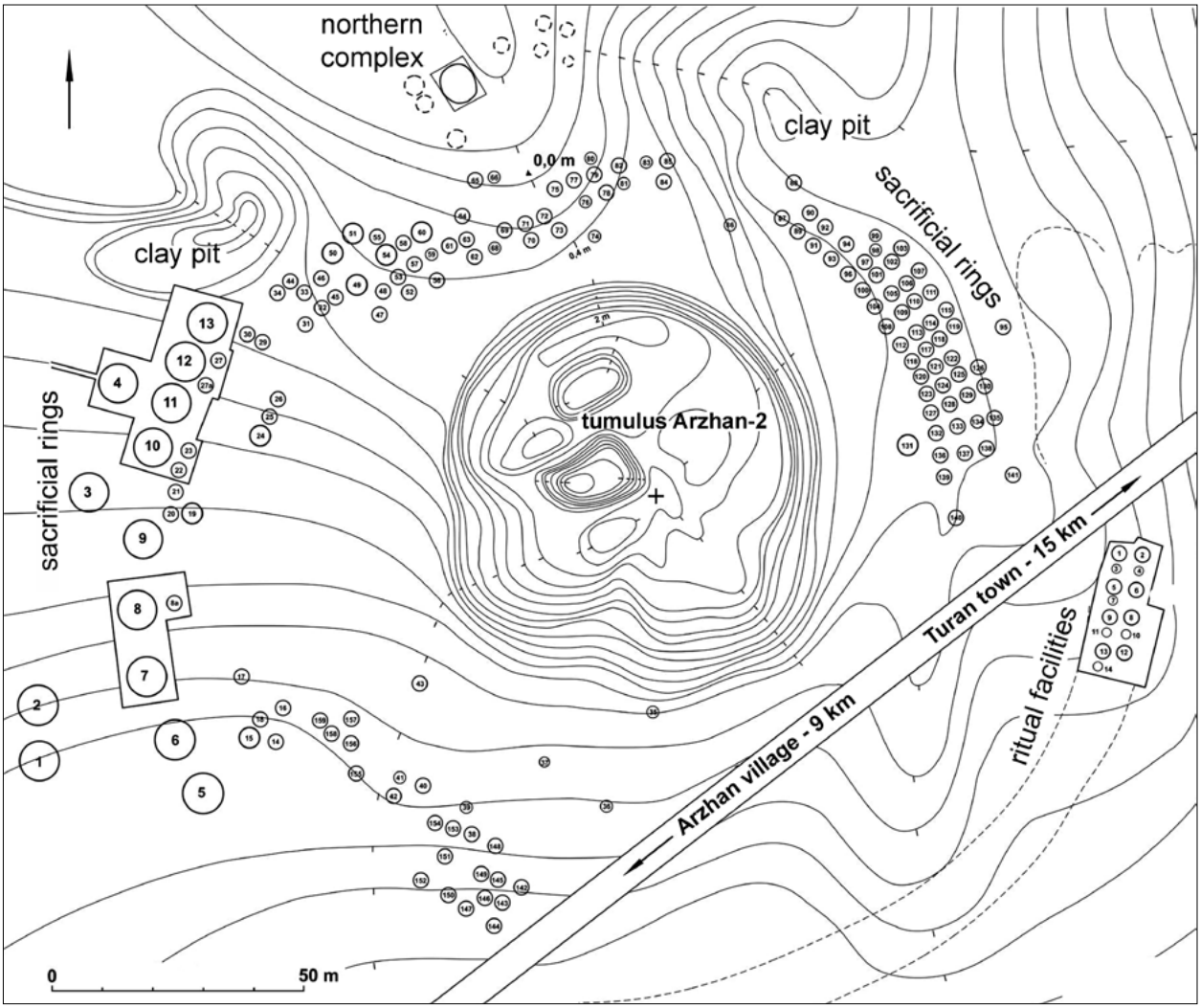

Figure 1. Plan of the Arzhan-2 funerary-memorial complex with excavations on the periphery marked

the petroglyphs were carved into this rock before the construction. Evidence of this is provided by Bronze Age rock art discovered during the excavation of the above-ground structure.[4]

The clay used in the barrow's construction originated from immediately beneath the monument and was therefore extracted directly from the steppe. Extensive hollows representing ancient clay pits are visible to the north and northwest of the complex, immediately beyond the sacrificial rings (see Figure 1). Shafts in the northwest pit showed that while extracting the clay, the ancient builders carefully removed small stones from it, just as modern stone-masons sieve sand for cement. The crushed stones and pebbles which remained on the bottom formed an even layer in the pit. It is instructive that similar clay pits can be seen near two other 'royal' barrows to the west of Arzhan-2, and their size is in direct proportion to the dimensions of the structure. It follows that the extensive use of clay was characteristic of barrows of this type. It may be that no similar pits have been recorded near Arzhan-1 because the territory around that barrow has been built on. No layers of clay were apparently found during its excavation but the whole upper part of the structure had been destroyed before the investigation of that monument began.[5]

Devonian sandstone is an ideal building material. Mainly slabs of medium size (20 x 30 x 7 cm and 30 x 40 x 10 cm) were used in the above-ground structure of the barrow, but larger slabs are frequently found. Even roughly assembled they form fairly solid joints which is reminiscent of regular masonry. This is well demonstrated by the area destroyed by robbers recorded in section *AG*: the stones thrown from the central section of the barrow on to its surface lay almost as compactly as those in the undisturbed parts of the structure (Figure 4). In this situation it is extremely difficult to isolate the constructively important elements of the original horizontal masonry. Only a

[4] Chugunov, Nagler and Parzinger 2006*a*.

[5] Gryaznov 1980: 6.

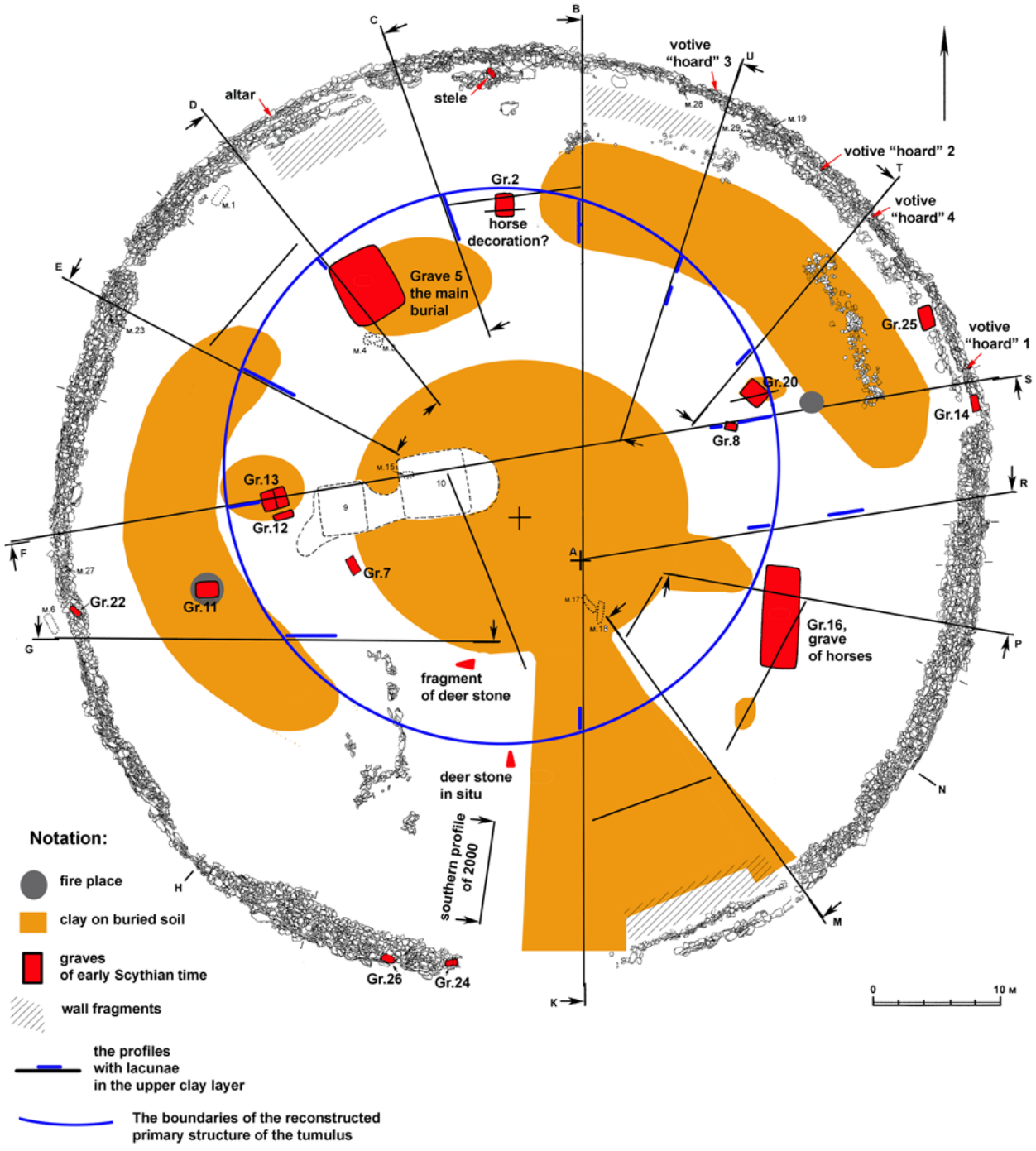

Figure 2. Plan of the Arzhan-2 barrow

detailed comparison of a large number of sections can establish a series of regularities in the structure: for instance, the wall encircling the area of the barrow within the fence was isolated and recorded in three sections only in the fourth year of the excavations (Figure 5).

This wall, which reaches a height of 1 m in its best-preserved sections, was laid with horizontal masonry. It had a base that was 2–2.5 m wide. The façade, which faces the fence (cromlech) and is slightly inclined inwards, was built with particular care. The wall was reinforced on the interior in several places by massive slabs laid in a sloping manner. In cross-section the wall is triangular in shape. This outline can be traced in virtually all the radial sections. Two sections of well-preserved wall were cleared in sections *ACD* and *ABU* but in section *AKM* a half-ruined wall was found whose masonry had collapsed into the empty space behind it inside the barrow (Figure 6).

The barrow's fence can be traced around its whole circumference, with the exception of the most destroyed section to the south. Its construction is a

Figure 3. Section *FS*. View from the east

Figure 4. Section *AG*. View from the north

Figure 5. The fence and wall in section *AUB*. In the background are cuts in the layer of clay on the buried soil

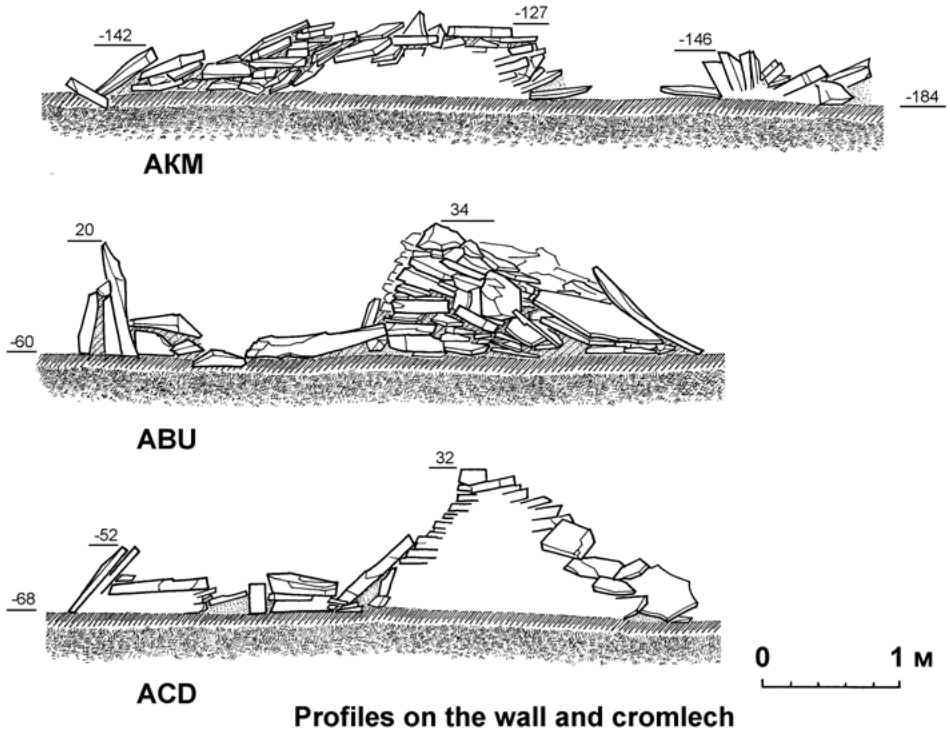

Figure 6. Cross-section of the wall and cromlech in sections AKM, ABU and ACD

combination of horizontal masonry and slabs placed edgeways. These slabs were often slightly dug into the ground, but sometimes they were simply leant against the horizontal slabs. For this reason, the revetted slabs are not always preserved *in situ* and in a number of places they have been forced out by stones sliding down the slope of the barrow. The cromlech itself is essentially marked by vertical revetted slabs supported by horizontal slabs or massive blocks of stone. On the outer limit of the fence's slabs the diameter of the barrow is exactly 75 m and nowhere is there any deviation from these dimensions.

The distance between the cromlech and the wall of horizontal slabs is about a metre (with the exception of the section opposite the main burial in section *ACD*, of which special mention will be made later). It is likely that this corridor was free of stones before the construction of the final embankment. This is indicated by the recorded collapses of the wall towards the fence (Figure 6). It can therefore be posited that the burials in Graves 14, 22, 24, 25 and 26 predate the building of the above-ground structure, since the stone cists for the burials were constructed in this corridor. It is no coincidence that detritus from the grave pits was recorded only above the burials and in direct proximity to them between the fence and the wall. However, the remains of a previous burial and accompanying implements were discovered beneath the body of a man in Grave 25. This instance shows that burials in this part of the barrow may have been admitted into already completed masonry and the stone layer over the grave restored.

In addition, it may be posited that in the process of the functioning of the funerary-memorial complex, some sections of the cromlech and the wall were rebuilt. In the northeast section of the barrow (sections *ARS, AST*, *ATU*) the facing of the cromlech was multi-layered, which was probably connected with the ritual 'hoard'-offerings discovered between the slabs in this section.

A pavement of slabs with a compact accumulation of bones – an altar – was recorded in section *ACD* opposite the principal burial in the barrow: Grave 5 between the fence and the wall. The remains of two sheep, the complete skeleton of a lamb and a dog's teeth were recorded on this pavement.[6] At some stage during the lifespan of the complex a section of the wall was rebuilt for the construction of this place of sacrifice. The façade of the wall was moved aside, widening the corridor between the wall and the fence by about a metre. However, the stones which lay at the base of the wall remained in their original place, duplicating the row of slabs parallel to the new façade (Figure 7).

[6] The animal bones were identified by Mikhail Sablin (Zoological Institute of the Russian Academy of Sciences). Three phalanges of a human finger were found among these, as reported by Hermann Parzinger in his reconstruction (Parzinger 2010). However, an analysis of the correlation of the strontium isotopes in bone remains carried out on all the burials in the barrow has shown that the numerical value of the isotopes in the phalanges fully coincides (to six decimal points!) with the data obtained for the bones from the secondary burial in grave 1 (Lokhov *et al.* 2007: 266, table 2). This is the closest burial to the altar which has been explored in the neighbouring sector, so it is entirely probable that the human bones ended up in this accumulation by accident.

Figure 7. Sacrificial altar between the fence and the wall opposite the principal burial

Figure 8. The rebuilt fence in section *ANP*

To all appearances, the cromlech in the southeast part of the barrow was reconstructed at some point. In sections *ANP* and *APR* the fence, constructed of horizontally placed slabs, had a regular trapezoid cross-section (Figure 8), but the wall cannot be traced. The remains of its base may be the slabs on the inner side of this section of the cromlech, which form a reversely inclined row to the outer facing. The construction of a low, carefully built fence in this section may have several explanations. One of them is that this was the entrance to the barrow. Another is the construction of a horse burial in Grave 16 opposite. It is possible that both explanations are justified for specific stages in the functioning of the complex. This section of the fence has another outstanding feature: it was here, opposite the horse burial, that stones with carved depictions were used for the facing slabs.[7]

As has already been noted, clay was widely used in the barrow's construction as well as stones. Outlines of layers of sub-soil lying on the buried soil were recorded and in the sections in some places. The most extensive layer of clay was in the central part of the structure. In ancient times it was levelled over the area and did not exceed 0.3 m in height. In addition, clay lenses can be traced at the base of the masonry to the northeast

[7] Chugunov 2008.

Figure 9. Cross-section of the clay bank in the eastern part of the barrow

and west of the centre, 5 to 7 m from the outer contour of the barrow (Figure 9). In comparing spatial observations with the stratigraphy traced in the radial sections we can confidently reconstruct two arched clay mounds located symmetrically in relation to the principal burial (Grave 5) in the northwest quarter of the barrow (see Figure 2).

In the central section the layer of clay on the soil of the burials is riddled with robbers' pits. Hermann Parzinger believes that these pits were dug in ancient times for holding funeral ceremonies,[8] but the author disagrees. In the exploratory process the sides of the pits were very difficult to identify as their composition below the level of the ancient ground-surface did not differ from that of the sub-soil. We dug through them down to the underlying rock base of the terrace, but to all appearances their actual depth was approximately a metre above the rock. The laying of earth and stones over the pits shows that they were dug in sequence: first pit 10, from which the bank lay to the south; then pit 9, in the digging of which the previous one was filled in. The lower part of a 'deer' stone was found among the stones of the detritus from pit 10 and probably once stood in the centre of the barrow. The contours of the pit were more clearly exposed after the area had been cleared to the level of the sub-soil. In the upper part they come closer together: the eastern wall of pit 10 is circular in shape while pit 9 has an inclined passage from the southwest (see Figure 2). This robbers' entrance passed right alongside Grave 13 but did not touch it. However, the robbers did destroy one burial, as miscellaneous bones (from Grave 15) and several amber beads were found in the contents of pit 10. The remains lay above the level of the sub-soil and may have been thrown out from a destroyed stone cist or pit. There is no doubt that pits 9 and 10 are the work of robbers searching for the central chamber.

A layer of clay on the buried soil is recorded along the whole length of section *AK* and, very importantly, is not traced in the southern cross-section dating from the year 2000. As a result, it is clear that the clay lay in a strip from the southern part of the fence to the centre of the barrow. This radial strip of clay may have marked the original entrance to the burial complex.

The layer of clay in the upper part of the structure is of great importance in reconstructing the stages of the barrow's construction. It is recorded in all the sections and covers almost the whole area in an even layer of about 40 cm (see Figures 3–4), with the exception of the slopes in the area of the fence and the wall. In the places where the above-ground structure has escaped later destruction it can be shown that the clay lies on stone masonry, directly above the burials on the area of the monument (Graves 13, 20). However, this layer does not appear in some sections. It is missing in section *AB* for a distance of 5 to 13 m from the fence; in section *AC* – for a distance of 5 to 12 m from the fence; in section *AD* – for a distance of 1 m (further there are later destructions in the upper part of the structure) 12 m from the fence; in section *AE* – for a distance of over 8 m (closer to the centre this may be connected with a robber's crater) to 13 m from the fence; in the unbroken section *FS* there is no layer of clay for a distance of 2 to 15 m from the fence in its western section and in a section of about 3 to 16 m from the fence in its eastern section. There is no layer of clay for a distance of 5 m in the upper part of section *AG* 15 m from the cromlech. The same pattern can also be traced, though not so clearly, in the sections in the northeast section of the barrow. There are also short breaks in the layer of clay in the southeast sections. The line on the sketch

[8] Parzinger 2010: 303–304.

Figure 10. Grave 13: overall view of the burial

connecting the outer points of these gaps in the clay layer forms an almost perfect circle with a diameter of 45 m on the territory of the barrow. This cannot be a coincidence. It is likely that this circle marks the original above-ground structure of the monument (see Figure 2). Additional confirmation of this is provided by the clay banks on the buried soil which encircle the area of the initial stone structure from the northeast and west. It originally covered the layer of clay in the centre and was itself covered with clay in the upper part of the masonry. It is likely that the clay around the circumference was enclosed by a line of 'dry' masonry and can be traced in the sections. They survived the infilling of the structure within the limits of the surrounding wall in the final stage of the functioning of the complex. It is obviously no coincidence that all the burials on the territory of the barrow are located under the edges of this primary structure. An exception is the child's Grave 11, above which the remains of a powerful bonfire can be traced. A fire over this burial would burn for a long time between the wall and the embankment. Almost opposite this bonfire, on the opposite side from the border of the primary structure, there are traces of another bonfire. A patch of burnt earth with inclusion of coal can be traced in the sketch and in section *FS* 2 m to the southeast of Grave 20 (see Figure 2).

Several burials were explored within the limits of the reconstructed primary above-ground structure. Their construction makes it possible to determine the sequence of their building. These observations indicate that the initial period of the functioning of the complex was relatively long. We shall now examine these in turn.

Grave 13 was a stone cist divided into two compartments (Graves 13a, 13b) placed in a rectangular pit and covered with slabs at a depth of 0.6 m from the buried soil (Figures 10–11). The space between the sides of the pit and the slabs of the burial chamber was filled with stones. Despite the fact that a robber pit passed quite close by, the above-ground structure over the burial was undisturbed and the layer of clay in the upper part of the barrow means that the grave was dug before the masonry was constructed. Furthermore, the division of the grave into two, the different depths of the burials in the respective compartments, and the way the slabs covering them were laid suggest that the burials were not contemporary. The stone cist 13b was built first. At a later stage, but before the barrow's masonry was made, the pit was widened and three walls of vertical slabs forming the stone cist of Grave 13a were added to the existing construction. As a result, some of the earth excavated to widen the pit lay on the covering of Grave 13b. The two compartments were again covered with slabs. The different depth of the slabs of the stone chests of 13a and 13b also confirms the sequence of the burials. Grave 12 was discovered at the level of the buried soil at the southeast side of the stone cist in Grave 13. The burial consisted of the compactly arranged bones of the skeleton of a young woman and a set of funerary goods, which were probably placed in a container which has not survived. The human remains were arranged on a southwest/northeast axis on the stones which filled the gap between the slab of the cist and the side of the pit. There were vertical slabs to the southwest and northeast of the bones. The robbers' entrance (pit 9) passed slightly to the south of the grave, which had led to the destruction of the masonry directly above the burial. For this reason it is not possible to say that this burial definitely predated the masonry. Nevertheless, considering that the separate parts of the decomposed body were buried precisely on the filling of the pit of the stone chest which already existed by that time, the sequence of this group of graves is clear: 13b, 13a, 12.

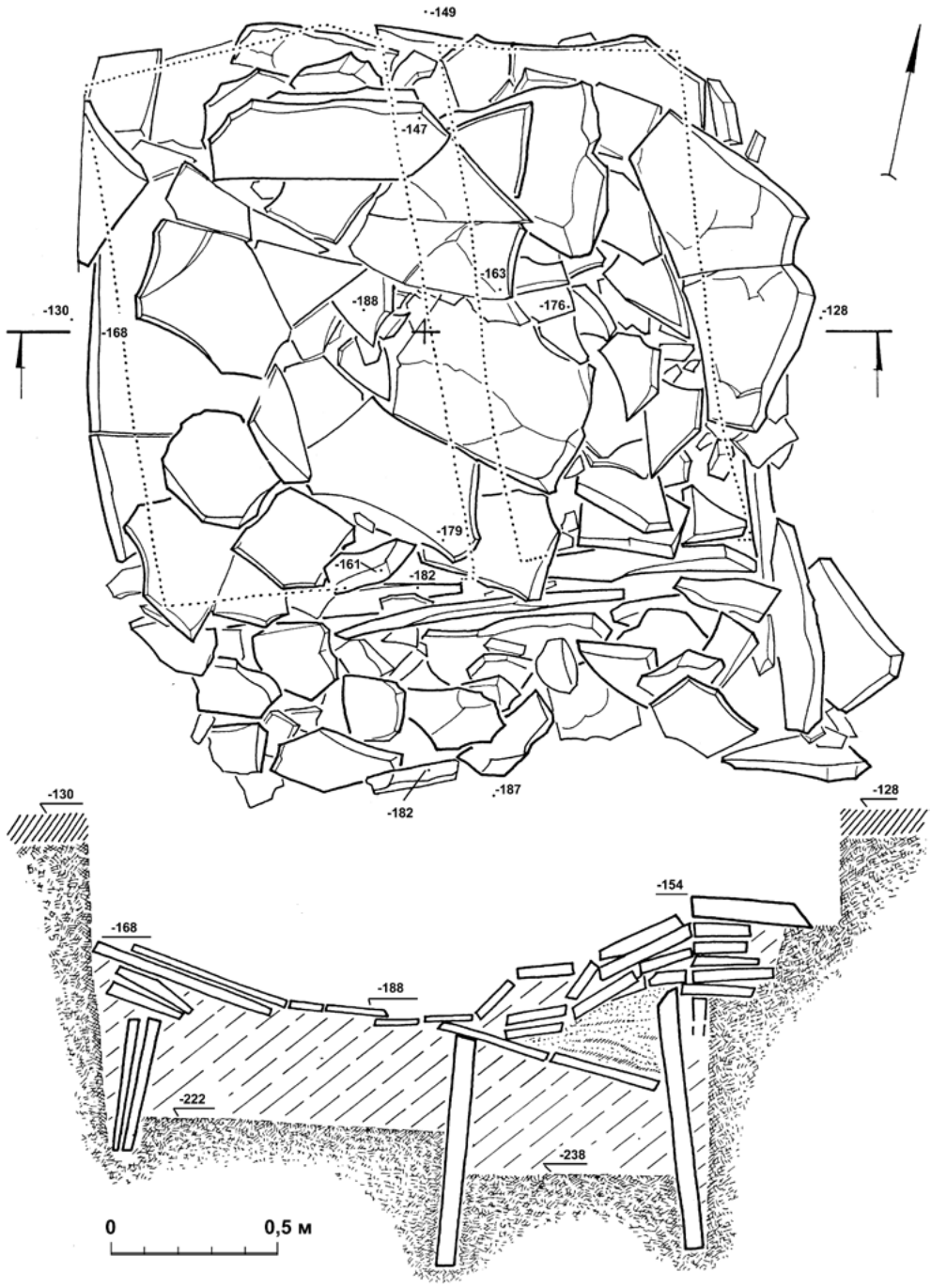

Figure 11. Grave 13: plan of the roofing slabs and cross-section

Grave 20 was discovered within the area of the barrow during the dismantling of the masonry of the structure in section *AST* (Figure 12). The upper part of the pit fill consisted of clean clay; the covering of the stone cist, which had sagged in the centre, was cleared. The fact that there were remains of two bodies in the grave, as well as the manner in which the slabs of the cover had been laid and the particular construction of the walls of the burial chamber, make it possible to draw certain conclusions about the sequence of the burials (Figures 13–14). The grave and the burial chamber in the form of a stone cist were built for the burial of a man with a set of weapons (skeleton 1). Sometime thereafter the grave was widened in a north-easterly direction. One of the long walls of the burial chamber was dismantled and reassembled near the side of the extended pit, while the northwest and southeast walls were built up with extra slabs. During these actions the roofing slabs of the original burial had not been dismantled and had subsided onto skeleton 1. Another man was then buried in the enlarged grave (skeleton 2). By the time of burial this body was already partly decomposed as some of the long bones were disarticulated but re-arranged close to their original positions. After the burial these remains were covered by slabs and the cover on top of the grave was restored: one side rested on the subsided slabs of

Figure 12. The pit of Grave 20 beneath the section

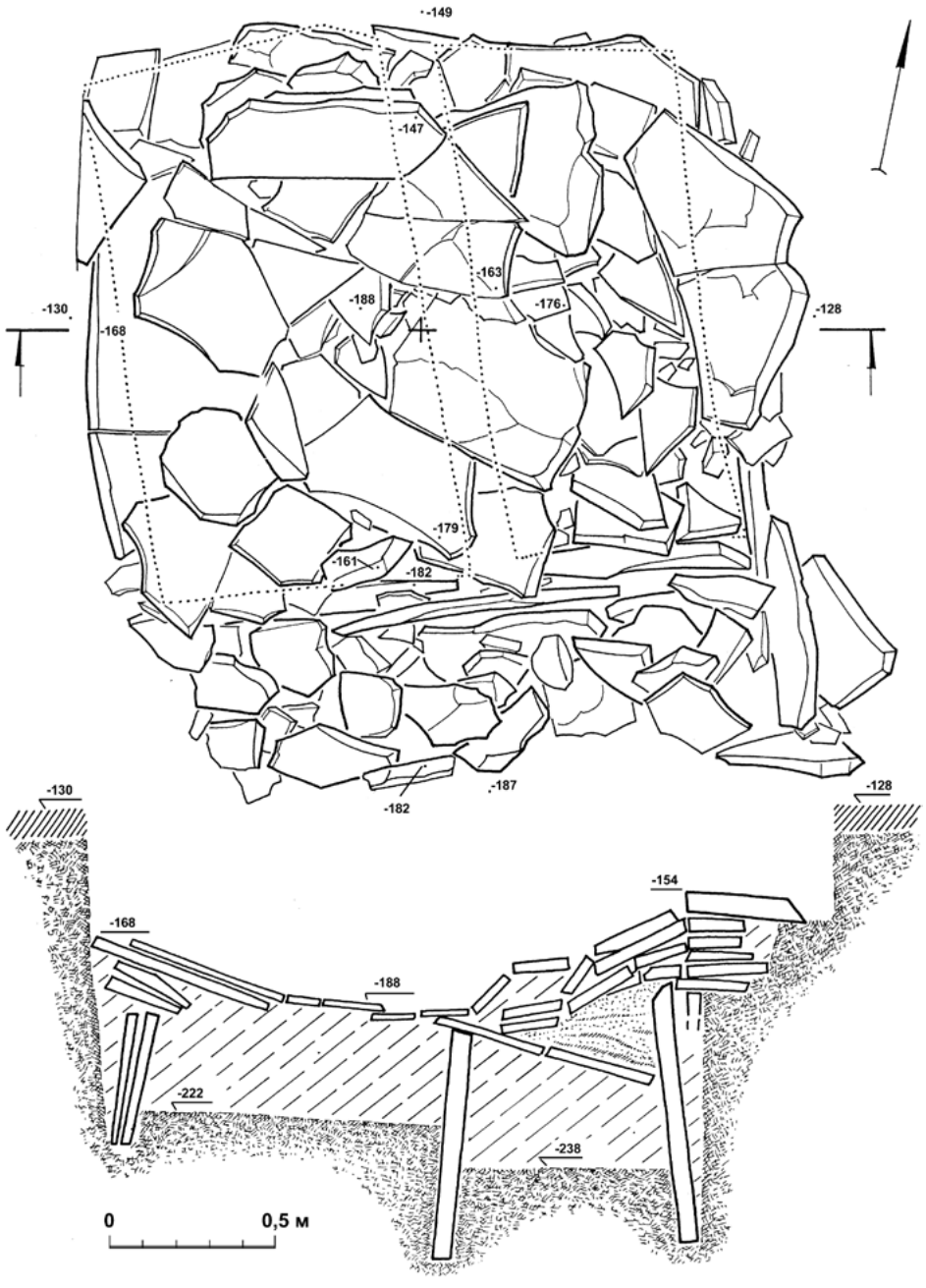

Figure 13. Grave 20: sketch of the covering and cross-section

Figure 14. Grave 20: overall view of the burial containing both skeletons

the original grave, the other on the restored wall and the built-up slabs of the stone cist. The layer of clay over the grave suggests that all this took place before the masonry of the barrow was laid.

Grave 25 in section *AST* between the façade of the wall and the cromlech had not been rebuilt but had been used for two burials. On the bottom of the stone chest, beneath the skeleton of a man with a set of armour, were the remains of accompanying implements and the bones of the original buried man's hand (Figure 15). There may have been a substantial period of time between these two burials.

It is important to note the observations made in examining the principal burial: Grave 5. In dismantling the framework and excavating the space between the walls of the burial chamber and the pit a badly crushed wooden coffin with the remains of a baby was found on the bottom near the eastern corner beneath horizontal slabs; this coffin was orientated parallel to the logs of the framework on a northeast/southwest axis (Figure 16). Many of the bones were missing and all that remained were the odd vertebrae and part of the pelvis and phalanx lying by the northeast part of the coffin. Two large amber beads

Figure 15. The burial in Grave 25

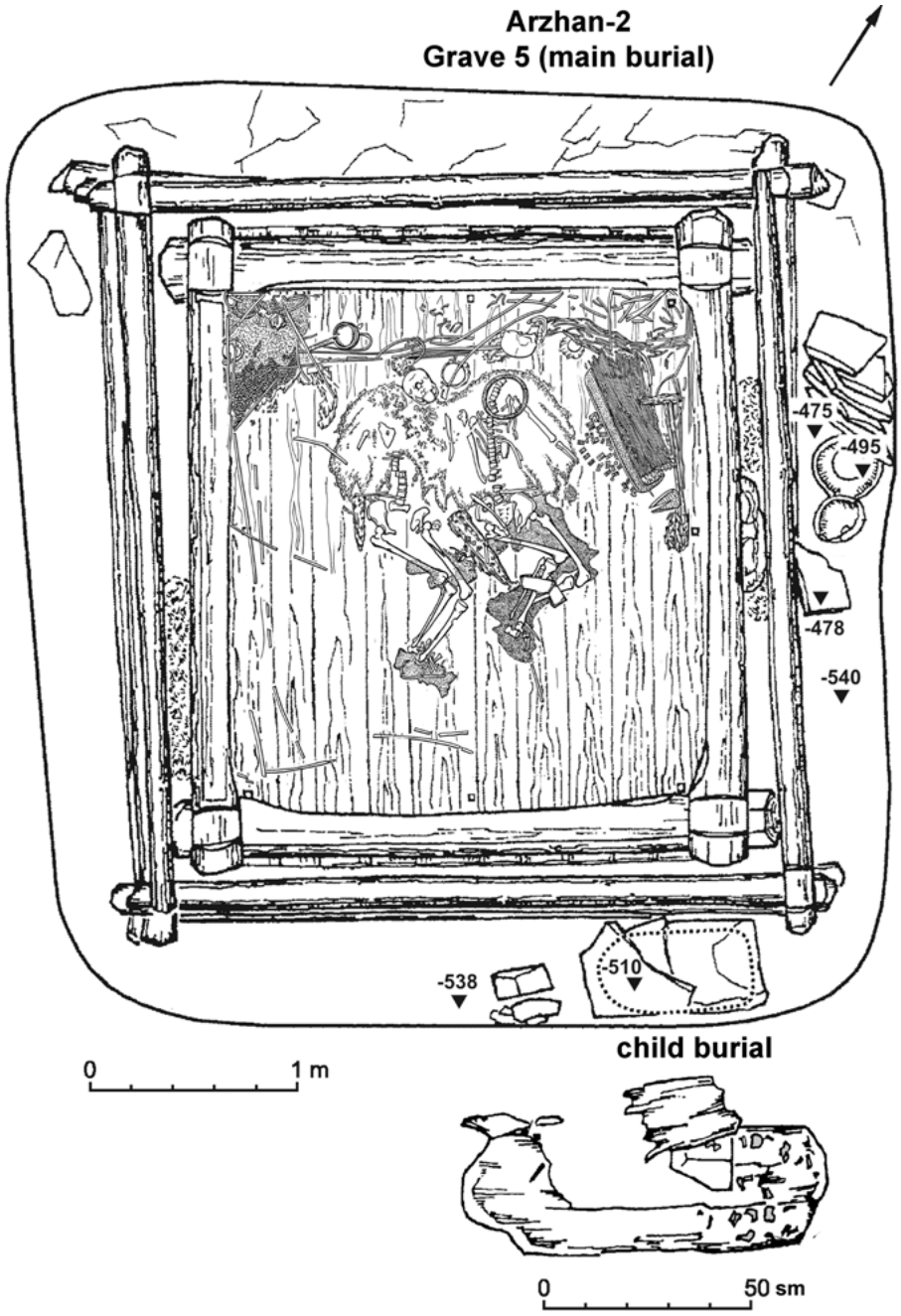

Figure 16. Grave 5: plan with the burial of a child behind the southeast wall of the burial chamber

were found among the bones, similar to those found in the western corner of the 'royal' grave. It appears that what we have here is a sacrificial burial carried out while the burial chamber was being built and before the main funeral ceremony. The basis for this assertion is the state of preservation of the coffin and the burial within: if the baby had been buried together with the 'royal' couple, the wood of the coffin would have been superbly preserved like the remainder of the wood in the grave. Instead, most probably the coffin with the child was placed behind the wall of the framework, filled with earth and covered with slabs when the walls of the burial chamber were being built. The grave was subsequently left open for a while in expectation of the burial. The funeral ceremony would have involved people walking between the sides of the pit and the framework (for example, to install the two cauldrons behind the northeast wall of the framework and to lay the logs of the covering), which led to the destruction of the coffin. At that time the grave was accessible to rodents which disturbed the baby's remains but these were later unable to enter once the deep pit was covered with clay as part of the main funeral. These observations confirm the somewhat extended timeframe of the preparatory stage of the construction of the burial chamber.

Important conclusions were drawn during a dendrochronological study of wood samples from three parts of the barrow, namely of Graves 2, 5 and

Figure 17. Overall view of the horse burial in Grave 16

Figure 18. Grave 16 in section *AP*

11. The research was carried out and published by the Siberian Department of the Academy of Sciences.[9] It was established that the felling of the timber for the burials in Graves 5 and 2 took place in the autumn or winter of the same year. The outer rings of the timber of the coffin in Grave 11 had not survived, but the tree-ring chronology carried out on this example shows that the dating of the wood is within a period of 30 years of Grave 5. According to colleagues this shows that the wood was cut at a similar time but does not confirm the synchronicity of this action with the felling of the timber for the two other structures.

The burial of 14 stallions was arranged on the level of the horizon (Figure 17). The synchronicity of this burial is confirmed by the stratigraphy of the skeletons *in situ* and a technical analysis of the harness. According to Raphael Minasyan, 12 of the 14 sets of harness were made from the same positive former used in the casting.[10] Before this grave was dug, the turf in the area was removed, as there is no buried soil in it. It has not been possible to identify any burial construction in the vicinity, but the remains of a covering made of stakes are recorded above the animals' skeletons. In section *AP* the subsidence of the mound after the collapse of the covering can easily be traced; the resulting crater was filled up with stones to the level of the barrow's surface (Figure 18). This pile of stones lay on the clay layer, which subsided along with its cover. These observations suggest that the horse burial was carried out at the same time as the above-ground structure was built. The hollow remained but covered with stakes, stones and clay, and was backfilled after the collapse of the cover.

Therefore, on the basis of the architectural elements of the above-ground structure, the burial constructions, stratigraphic and spatial observations and dendrochronological data recorded in the process of the exploration, a reconstruction of the stages of the building and functioning of the Arzhan-2 funerary-commemorative complex can be suggested.

[9] Myglan *et al.* 2006.
[10] Minasyan 2014: 147.

First Stage (preparatory)

The construction of the burial site began after the death of the chieftain. A stone quarry was developed two km to the northeast of the barrow for this purpose. In the process a stone with petroglyphs was completely destroyed. Stones with carved images lay at the base of the original construction. Some of them were deliberately used in the facing of the fence. The work began with the building of the wall and the fence. The borders around the barrow were undoubtedly first marked out, evidently with a rope. Probably at the same time a pit was dug in the northwest section of the barrow (Grave 5). Clay was brought in from a nearby source, on the steppe to the north of the complex. A clay 'path' was laid from the southern edge of the barrow to the central area. A passage was presumably left in the wall and the fence. It may have been at this stage that a stele was erected in the fence and a grave dug in the northern section of the barrow opposite it (Grave 2). The burial constructions were made elsewhere, then brought in and assembled inside the grave.

The end of the preparatory stage was marked by sacrifices – the burial of the baby in a wooden coffin near the southeast wall of the burial chamber in the principal grave, sacrifices of small cattle and the placing of their meat at the base of the stele. Two pottery vessels whose shards were found among the slabs of the fence were possibly also installed at the same time. The burial of a murdered man – the only grave without accessories in the barrow, discovered in the southern part of the fence (Grave 24) near the entrance to the burial area – may have been linked to the sacrifice.

Second Stage (funeral)

The ceremony of the 'king's' funeral cannot, of course, be traced fully on the basis of the archaeological material. It was obviously a magnificent ritual accompanied by numerous sacrifices, including human sacrifices. At any rate, a woman buried in the principal grave was placed in the vault at the same time as the chieftain. It was probably at this stage that the first burials in the area enclosed by the wall took place (Graves 13b and 20, skeleton 1).

Cauldrons and a plate – attributes of funerary rituals – were placed in the 'king's' grave. Adornments of the 'king's' horse were placed in Grave 2 and a set of harness between the slabs in the eastern section of the fence ('hoard' 1). Circular tower-like structures were built to the southeast of the barrow, probably at the same time and to a single plan. According to Anatoly Nagler they may have been used as tables for the funeral repast during the farewell to the dead chieftain. At any rate, nothing was found in the excavations of these 'towers' but bones of horses and sheep and fragmentary pottery were found between them. The hides of the animals consumed at the funeral repast were probably subsequently hung up here, as indicated by the combination of cranial and lower leg bones.

It is difficult to say whether the burials in the corridor between the wall and the cromlech took place in this or the following stage. The visible traces of the violent death of some of those buried in these graves (Graves 22, 25) suggest that they were deliberately killed to accompany the 'royal' couple in the afterlife. At the same time, the secondary burial in Grave 25 is evidence of a certain prolongation in the time of the burials in some of the stone coffins. This is confirmed by the additional burial in Grave 20 of a semi-decomposed skeleton and the creation of another compartment in Grave 13. The later widening of these pits and also Grave 12, located precisely on the edge of the stone chest, indicate that at one time all the burial complexes were accessible. There were probably only low clay mounds above the graves.

It is impossible to say for how long the barrow's territory remained uncovered. Ring fences were probably already beginning to be built around the monument. In all likelihood their construction started with the most regular rows in the east. The burnt bones of sacrificed animals may have been brought in from distant nomadic territories where rituals dedicated to a dead chieftain were also performed (Figure 19). At any rate, no traces of fire within the rings were recorded.

Third Stage (end of the funerals)

Following the last funeral in the barrow and completion of all accompanying rituals, the period of its functioning as an open burial area came to an end. This stage was marked by the building of the initial mound (Figure 20). This structure, 45 m across, was laid across the top of all the graves in such a way that its edge was above the northwest side of the principal burial. A layer of clay was placed over the masonry, reducing the structure's circumference. A tall 'deer' stone was installed in the centre. A slope up to the upper area may have been built to the south. Another 'deer' stone was installed by the edge of the mound and may have marked the entrance. The 'deer' stones formed a strictly meridionally orientated row with the stele standing beside the northernmost point of the wall. It is most likely that after this structure had been built another sacrificial burial of a baby in a wooden coffin took place (Grave 11). Immediately after this interment a fire was lit which burned for a long time on the grave judging by the thick layer of ash. A fire was also lit on the opposite (eastern) side of the initial barrow.

Figure 19. Reconstruction of the formation of the funerary-memorial complex and the section of the barrow: first and second stages (draughtsman: Igor Ananiev)

It may have been at this stage that the wall opposite the principal burial was rebuilt and a place of sacrifice was installed in the space between the wall and the fence. This was probably because the entrance to the territory of the barrow was closed up at the end of this stage. It was presumably also at this stage that the burial in Grave 8 took place. For some reason the man in it was not buried during the second stage. The stone cist was possibly built during the process of laying the masonry, or the grave may have been inserted at the edge of the barrow's initial mound at a later date.

Fourth Stage (final)

During the first three stages the burial structure was built and maintained in the appropriate manner. There followed a period of the passive function of the complex. At that time some rituals continued to be performed alongside the barrow: ring fences were built and offerings interred in the northeast section of the cromlech. The wall of the monument had already begun to disintegrate at that time.

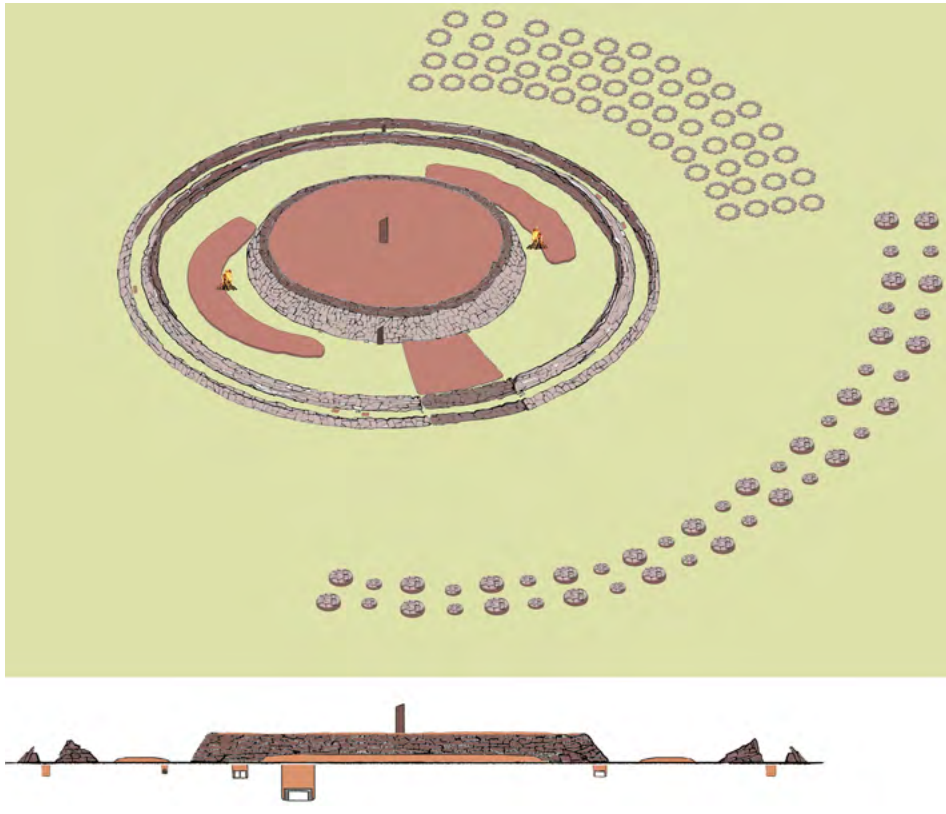

Figure 20. Reconstruction of the formation of the funerary-memorial complex and the section of the barrow: third stage (draughtsman: Igor Ananiev)

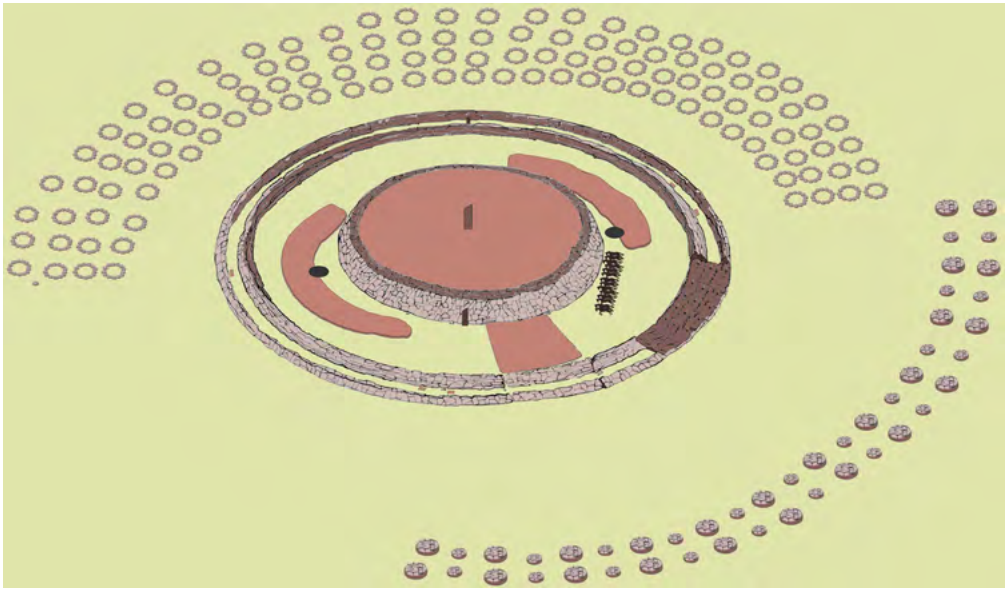

Figure 21. Reconstruction of the formation of the funerary-memorial complex: beginning of the fourth stage (draughtsman: Igor Ananiev)

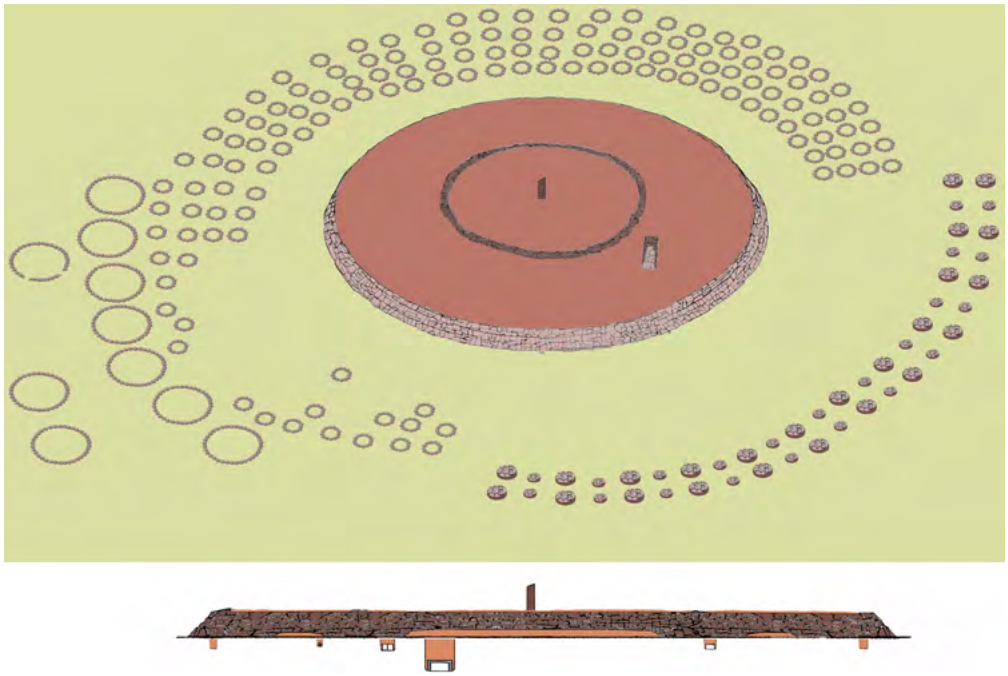

Figure 22. Reconstruction of the formation of the funerary-memorial complex and the section of the barrow: end of the fourth stage (draughtsman: Igor Ananiev)

At this stage came the moment of the final construction of the monument. This was accompanied by the burial of horses. For this purpose the wall in the southeast part of the barrow was dismantled, 14 bridled stallions from various herds ('king's' herds, offerings?) were led on to it and slaughtered (Figure 21). After this the entire area of the barrow was covered with a single structure of slabs and the remains of the wall were used for its foundations. The horses were buried at the same time as the building of the final structure: the grave was covered initially by a framework of wooden stakes, then by stone and clay and at some later point, after the covering had collapsed, the hollow was filled with stones.

As a result of all this work the complex now began to resemble a platform of slabs and clay with a 'deer' stone in the centre (Figure 22). The ritual ring fences around the monument continued to be constructed over quite an extended period. The large rings were probably the last to be built. The stone structure was used for burials only in later periods.

It should be noted that by no means all the complexes and structural details recorded during the excavations are reflected in this reconstruction. For instance, the purpose of the U-shaped construction of slabs inserted into the ground on their sides in the southwest section of the barrow is not clear. In Hermann Parzinger's reconstruction, he attributes great significance to it as marking a route from Graves 24 and 26 through a passage between two pits to the principal burial. Assuming that Graves 9 and 10 were robbers' pits, it is possible that

the construction may have been erected in the second stage of the functioning of the complex for certain ritual purposes. I would only remark that, in its outline and dimensions, it almost coincides with the area of the horse burial (Grave 16).[11] However, the Bronze Age cultural layer in the foundation of buried soil beneath the monument does not exclude the existence of the remains of a rectangular fence even before the barrow was constructed. Similar structures were investigated by Alexander Adrianov and Sergey Teploukhov in the Turan-Uyuk Basin in the early 20th century.[12] It may be no coincidence that a single broken pottery vessel with Bronze Age decoration was found and a small pit excavated with charcoal and the sublingual bone of a bullock in its fill.[13]

Secondary Grave 7 was dug between the stones of the above-ground structure. The woman with a set of horn arrows may have been buried in the third stage, or perhaps the grave post-dates the final construction of the mound. However, what links it with the spatial organisation of the barrow is that it coincides with the strong tradition observed of placing female burials in the western half of a complex.[14] Moreover, the rare type of arrowhead found here corresponds to one of the quiver sets in the monument examined in detail below.

Determining the date when the northern complex of Arzhan-2 was constructed is a matter that merits particular attention. The pit filled with fragments of human and horse bones may be the result of clearing the barrow's territory, perhaps the remains of a ritual similar to that described by Herodotus for a post-mortem public display made a year after the completion of the barrow for a king:

> 'Of the king's remaining servants, they choose the fifty most suited to their purpose –all of whom, I should add, will be native-born Scythians, since those who serve in the royal household are ordered there by the king himself, rather than being purchased with silver for the purpose – and after they have strangled these servants, together with fifty of his finest horses, they gut them, clean them out, stuff them with chaff and sew them up. Next, they cut a wheel in two and fix both halves on wooden posts, so that the curves are facing the ground, and then fix a whole number of wheels in the same fashion. This done, they drive thick stakes through the horses, right the way to their necks, which they use to mount the horses on the wheels. The front half of each wheel is used to support a horse's shoulders, and the rear half its stomach, directly next to its thighs. The legs on both sides are left hanging in the air. The horse is also fitted out with a bit and bridle, which is stretched and secured to pegs directly facing it. Each of the fifty young men who have been strangled is mounted on a horse by a stake that is driven straight upwards, in line with the backbone, all the way up to the neck. A portion of this stake, however, is left to project downwards, and is secured to the stake driven through the horse by means of a socket. The horsemen are then set up in a circle around the tomb, and everyone gallops off'.[15]

In any case, specialists have determined that these are the bones of 12 men and of the same number of horses, which can hardly be a coincidence. Several separate human bones were repeatedly recorded among the stones of the above-ground structure when the masonry was dismantled. It has to be admitted, however, that at this stage of the investigation this proposition cannot be proved.

In order to relate the individual complexes to the stages of the functioning of the monument it is, of course, necessary to take into account the typological characteristics of the objects found in them. The principal chronological indicators for early Scythian monuments in southern Siberia, middle and central Asia are items of harness and quiver sets. At Arzhan-2 the harness is very uniform and does not exceed the bounds of the 7th century BC. In order to establish the chronology of Arzhan-2 and its component parts in particular it is more important to analyse the mass of material, including arrowheads and knives, discovered in most of the burials.

Arrowheads represent the largest category of finds at Arzhan-2. Those found in the monument substantially complement and, in some aspects, correct the earlier classification of arrowheads from monuments in Tuva.[16] The quiver sets are most instructive of the correlation between the individual complexes of the monument. The excavations yielded a total of 82 arrowheads: 14 of horn, one of wood, 27 of iron and 40 of bronze (Figure 23), and this does not even take into account the more than 50 iron arrows from the principal burial. It has not been possible to restore them but their type can be proposed: quadrilobate socketed arrowheads with an interior socket. The arrows in the quivers from individual closed complexes are very varied, enabling a typology of arrowheads to be developed and a comparison made between sets discovered in the monument.

[11] In an unpublished work, Nina Zhogova drew attention to this in her analysis of rituals connected with horses on the wide territory of the Eurasian steppes in the early Scythian period.
[12] Kyzlasov 1979: 24–25.
[13] Chugunov, Nagler and Parzinger 2006*a*: 306.
[14] Chugunov, Parzinger and Nagler 2003: 145, fig. 31.
[15] Herodotus, *The Histories* 4.72.
[16] Chugunov 2000.

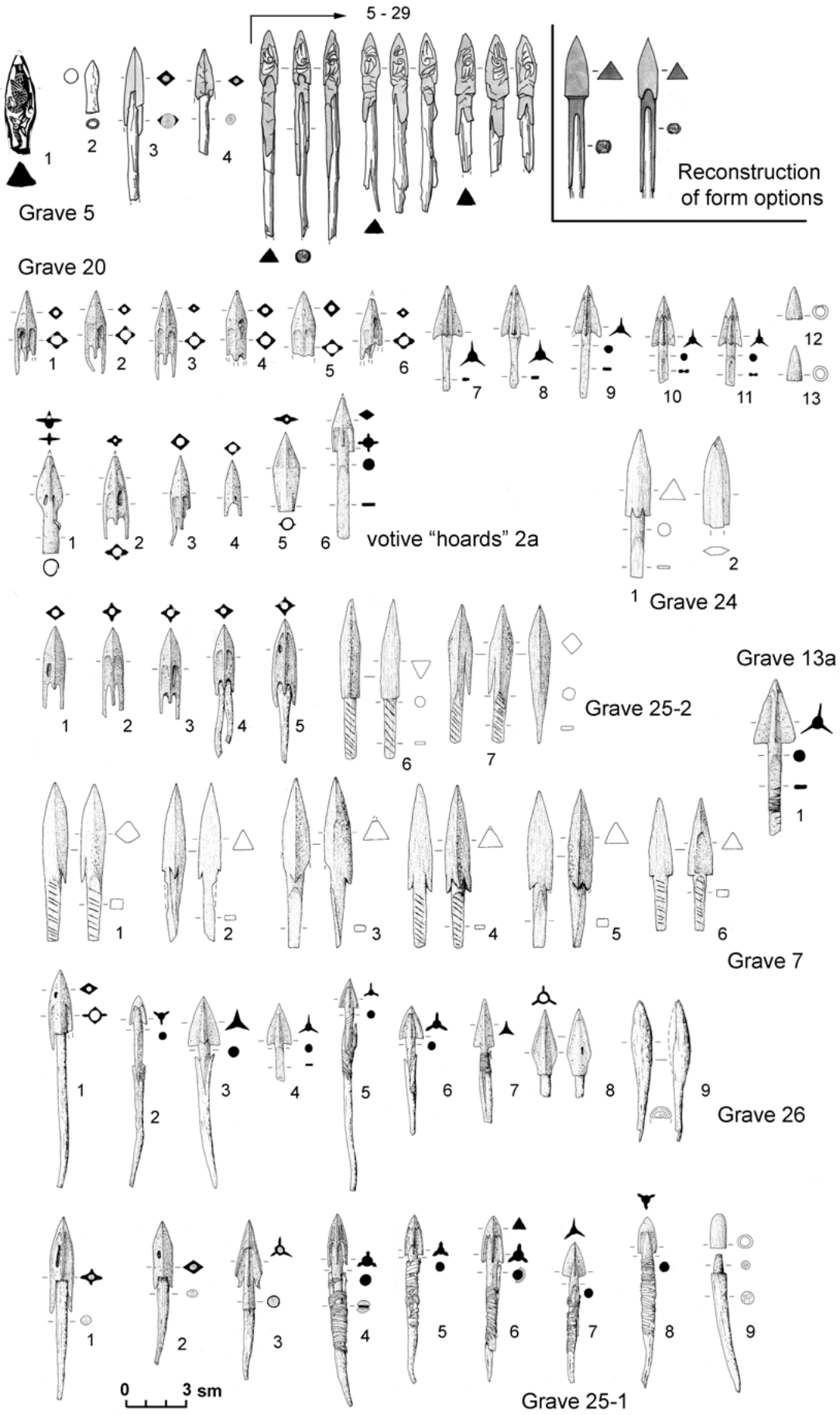

Figure 23. Arrowhead from complexes in the Arzhan-2 barrow

		10	15	2	14	12	3	5	11	16	17	18	24	28	26	25	29	7	8	4	1	9	19	6	23	20	21	22	13	27	30
10	1D1	X																													
15	2A3		X																												
2	1B1			X																											
14	2A2				X																										
12	2A1a					X																									
3	1B2						X																								
5	1C16							X																							
11	1E1								X																						
16	2B1a									X																					
17	2B1б										X																				
18	2B1в											X																			
24	II-1A2												X																		
28	II-2A2													X																	
26	II-2A1б														X																
25	II-2A1a															X															
29	II-2B1																X														
7	1C3a																	X													
8	1C3б																		X												
4	1C1a																			X											
1	1A1																				X										
9	1C4																					X									
19	2C1																						X								
6	1C2																							X							
23	II-1A1																								X						
20	3A1a																									X					
21	3A1б																										X				
22	3A2																											X			
13	2A1б																												X		
27	II-2A1в																													X	
30	II-2C1																														X

Table 1. Correlation of types of arrowheads found in complexes of the Arzhan-2 barrow: the first line and column show the numbers of the types of arrows, the second column shows the classification type (Chugunov 2011*a*).

In analysing all of the materials from Arzhan-2 it must not be forgotten that the stratigraphic observations made in the process of the investigations enable most of the burial complexes inside the monument to be synchronised only in relation to the stages of their functioning. Although we do not know how long the process of the funerary and memorial rites may have taken, it is nevertheless possible to establish a very general sequence of the complexes according to the stages at which they were included in the barrow. This has already been done in the reconstruction of the stages of the funerary-memorial complex's creation and functioning, but it is appropriate here to return once again to the stratigraphic observations, concentrating our attention on the structures with arrowheads.

The initial complexes with arrowheads in the barrow are, of course, Graves 5 and 20, which were built before the erection of the original above-ground structure. It is impossible to specify on the basis of the stratigraphy the length of time that passed between them and the burials in Graves 25 and 26. A rather rare case of internal stratigraphy can be observed in Grave 25, where two sets of arrowheads were found. The difference in composition of the arrows in the two quivers may be informative and provide evidence of the fairly long functioning of the complex. 'Hoard' 2b, which includes a set of arrows, a belt plaque and a bit, may have been placed between the slabs of the cromlech immediately after its construction. The arrows found among the bones of the burial in Grave 24 may turn out to be from the same time as the beginning of the functioning of the barrow only in the event that the supposition of the sacrificial character of this burial is correct.

A classification of the arrows in the quiver sets from the Arzhan-2 funerary-memorial complex identified 82 arrowheads of 30 types.[17] This subdivision is caused by the variety of these artefacts which are characteristic of Aldy-Bel period quivers. Meanwhile, some types were found not just in one complex of the monument but in two or more. For clarity a correlative table of the types encountered in the complexes has been drawn up, from which it is evident that all the arrows fall into two groups (Table 1). It is of vital importance that the early and late sets of arrows from Grave 25 ended up in different groups in the correlation. This division may be explained by the different chronology of the complexes within the monument. The types of arrowheads from the later quiver from Grave 25 are concentrated in the upper section of the table, which suggests that this whole group relates to a later period. The set from Grave 26, also included in this group, is probably from a similar period. The second group can be regarded as earlier. Common to both groups of complexes are two types of tanged arrows. It should be noted that the section of trilobate tanged arrows linked the early and late groups of Aldy-Bel quiver sets in the initial analysis of the classification of this weaponry.[18]

The overwhelming majority of arrowheads of the socketed group from Arzhan-2 are quadrilobate (the one bifacial arrowhead is presumably an anachronism relating to the late Bronze Age, as supported by the composition of its metal which is arsenical copper). The later group in the correlation include quadrilobate

[17] Chugunov 2011*a*.
[18] Chugunov 2000: 222–23.

arrowheads and two more examples of trilobate arrowheads with a projecting socket and barbs on the ends of the blades (Figure 24). As already noted, the distribution of the arrows in the tanged group was not so straightforward. There were trilobate examples in both the early and late groups but trilobate arrowheads were included only in the later group (Figure 25).

As a result of this analysis, on the basis of the selection of arrows it was possible to define one of the accompanying complexes of Arzhan-2 (Grave 26), which has no obvious stratigraphic link with the subsequent stages of the functioning of the monument, as belonging to a later period. However, it must not be forgotten that the arrowheads come mainly from the male burials at Arzhan-2 and do not include all the complexes of the monument. In order to verify the previously defined sequence of the building of the burial structures it is necessary to examine another category of finds, namely knives. A large series of

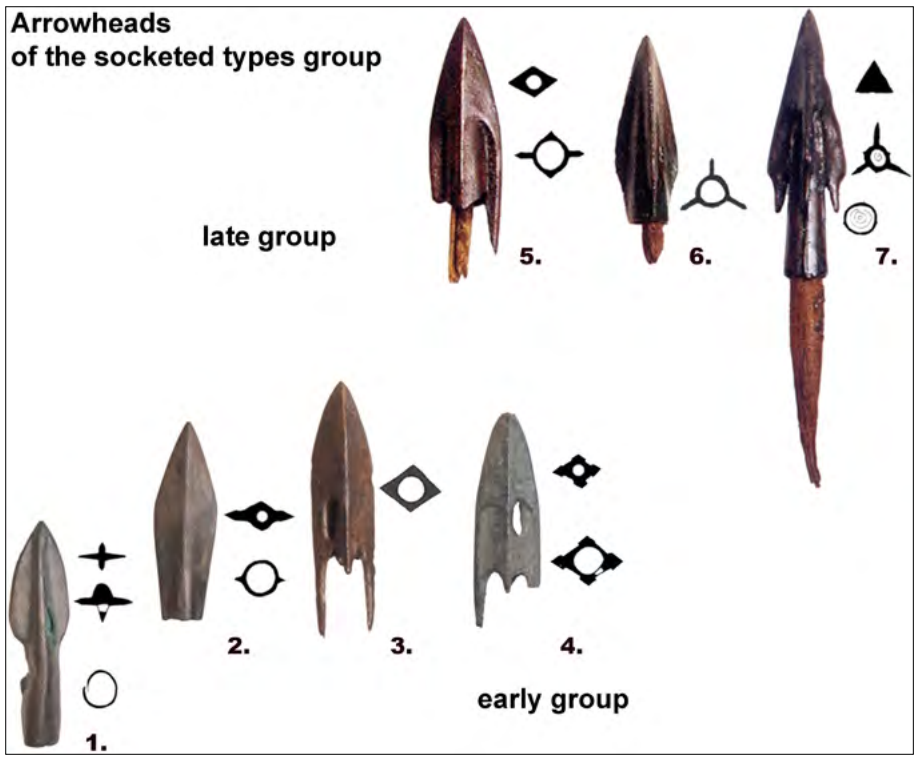

Figure 24. Socketed arrowheads of the earlier and later groups

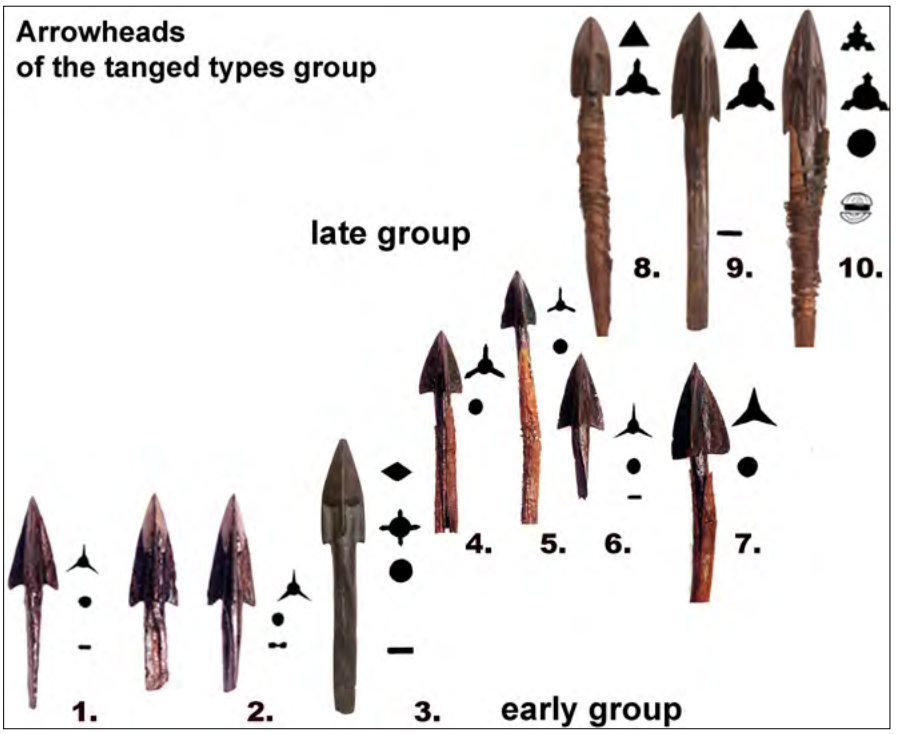

Figure 25. Tanged arrowheads of the earlier and later groups

knives was found in the monument, 18 in all (Figure 26). They accompanied every adult burial (with the exception of Grave 24) and the man and woman in the principal grave had two iron knives each, together with an *akinakes* and a dagger in a scabbard. Another iron knife was found in Grave 22. The remaining artefacts in this category of finds were made of bronze. All the knives are single-edged with a full tang and, according to the most prevalent classification by Sergey Kiselev,[19] have two different shapes with either curved or straight blades. Considering that almost all the artefacts are individual according to some parameters, a detailed typology of them in this case is hardly likely to be expedient. In examining the knives from a single complex, albeit one that functioned for a somewhat extended period of time, it is more appropriate to examine them, not so much from the point of view of a formal classification, as to identify the set of attributes specific to that complex. It is nevertheless necessary to provide a description of the knives and, for convenience of comparison, to divide them into rough groups.

This grouping is based on the most important component in the morphological description of artefacts in this category: the design of the knife's handle and its upper part. The whole collection of knives from Arzhan-2 can be divided into several groups according to this indication:

- knives with a ring-shaped pommel (all four knives from Grave 5 and one from Grave 22 with a heart-shaped ring) (Figure 26.1–5);
- knives with a trapezoid handle widening towards the top and various designs of finial (knife 2 from Grave 13a with riveted vertical loops with double-link chains with figures of birds on the ends; knife 1 from Grave 14 with an aperture near the end of the handle; knife 1 from Grave 25 with a triangular notch and a finial in the form of a bow-shaped plate with a loop below it; knife from Grave 26 with a tracery cast ornament on the handle in the shape of alternating triangular apertures forming a horizontal zigzag) (Figure 26.9–12);
- knife with an L-shaped finial on the handle and two comma-shaped apertures below it (knife 2 from Grave 14) (Figure 26.13);
- knives with a pointed end to the handle (badly corroded knife from Grave 13b; knife 1 from Grave 20; knife 2 from Grave 25 with a horizontal relief projection on one side of the handle) (Figure 26.6–8);
- knives with a rounded finial on the handle (knives from Grave 8 with a horizontal projection on one side of the shaft, from Grave 12 with an aperture near the end of the handle, knife from skeleton 1 in Grave 13a with a horizontal loop on one side of the handle, knife 2 from Grave 20) (Figure 26.14–18).

The knives found in complexes with paired burials which are synchronised by all indicators include: knives from Grave 5 relating to group 1 (Figure 26.1–4), knives from Grave 14 relating to groups 2 and 3 (Figure 26.12–13) and knives from Grave 13a relating to groups 2 and 5 (Figure 26.9, 17). It is instructive that knives of different types were encountered in accompanying burials. This confirms the chronological proximity of almost all the identified groups. However, if you approach the complexes with the known internal sequence, an earlier group of knives can be identified – group 4. Straight full tanged knives with a sharp end to the handle were found in the earlier 'b' section of Grave 13 (Figure 26.6) and near the first man buried in Grave 20 (Figure 26.7). A knife discovered among an early set of arrows at the bottom of Grave 25 (Figure 24.8) also belongs to this group, though it also has a characteristic which links it with the knives in group 5 – a horizontal protuberance on one side of the handle.

It can therefore be concluded that the specific phases of the Arzhan-2 complex can be based on an analysis of this category of finds. However, if the later component of the monument, which had been dated on the basis of the composition of quiver sets is considered, one may conclude that an insignificant interval in time passed between the burials beneath the original above-ground structure and the graves by the cromlech. The knives found in Graves 14, 22, 25 (knife 1) and 26 conform to those in the original burials in Arzhan-2. This is also confirmed by other finds: in particular a gold earring with a granulated conical lower portion found near the last man buried in Grave 25 was similar to those found in other complexes in the monument.

These ornaments presumably did not change as rapidly as the knives. Nevertheless, if all the above observations are considered, certain propositions can be made in the examination of this category of finds: for example, an iron knife from Grave 22 (Figure 26.5) corresponds to artefacts from the principal burial, and a conical earring and a bone ferrule on a ring was found in the accompanying burial of a woman (Figure 27.2). Earrings with similar ferrules adorned the woman in the 'king's' burial (Figure 27.1): despite the absence of a direct stratigraphic link, this grave should be dated to an early stage of the functioning of the monument. The probability of this chronology is fairly high. It is particularly instructive that Graves 22 and 25 are placed almost symmetrically in relation to all the known structures of the first stage of the barrow's construction (see Figure 2).

[19] Kiselev 1951: 119.

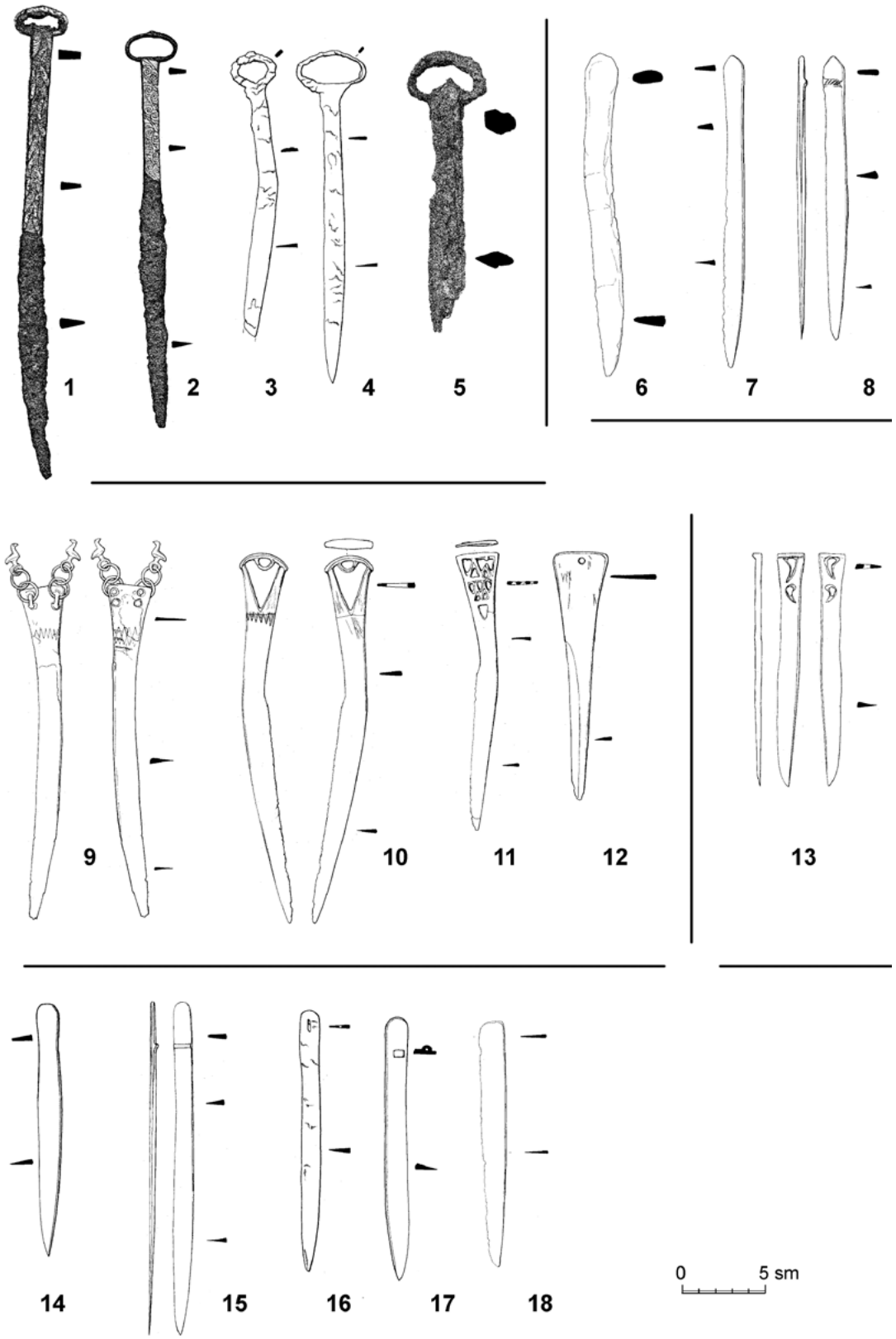

Figure 26. Knives from complexes in the Arzhan-2 barrow

The proposed reconstruction of the stages of the functioning of the monument, supplemented by an analysis of the multiple sets of arrowheads and knives, now makes it possible to present the relative chronology of the individual graves and other components of the Arzhan-2 funerary-memorial complex in the following form (Table 2).

All the above observations demonstrate the formation of the Arzhan-2 funerary-memorial complex in stages.

Figure 27. 1: Gold earring with gold ferrule from Grave 5. 2: Gold earring with bone ferrule from Grave 22 (National Museum of the Republic of Tuva; photograph by V.S. Terebenin)

Stage of construction and function of the monument	**Arrangement of individual funerary and ritual complexes and other finds**
Period before the monument was built	materials from the cultural layer under the monument most of the depictions on slabs from the above-ground structure
Period when the barrow's original structures were built	wooden coffin with the burial of a baby behind the framework in grave 5 possibly grave 24
Period of the 'royal' burials	principal burial of a couple in grave 5 grave 2 with bridle decorations (?) probably graves 13b, 20 (skeleton 1) graves 22 and 25 between the wall and the fence (initial) 'hoard'-offering 1 several fragments of vessels collected among the stone 'tables' possibly 'hoard'-offerings 2b, 3, 4 pottery vessels in the cromlech
Period before construction of the initial stone structure	grave 13a burial of skeleton 2 in grave 20 grave 12 (after 13a)
Period of construction of the original stone structure	grave 11 (burial of a baby) possibly grave 14 'deer' stones 1/01, 1/02
Period after construction of the initial stone structure	graves 7–8
Period of construction of the final stone structure	burial of horses in grave 16
Period after construction of the final stone structure	graves 25 (secondary burial), 26 melted down bronze and gold artefacts from large ring fences; possibly 'hoard'-offering 2a

Table 2. Relative chronology of the funerary monuments at Arzhan-2

The identification of trends in the development and transformation of the shapes of various categories of objects is very promising, as in future it may lead to the drawing-up of a detailed relative chronology of nomadic culture in the early Scythian period. The analysis of materials from the stratigraphically interrelated complexes of Arzhan-2 is only part of this work. At the same time, parallels and analogies to materials in the exclusive Tuvan barrow drawn from monuments in neighbouring and distant regions[20] show that the problem of the synchronicity of antiquities in southern Siberia, middle and central Asia and other territories remains to be resolved. Matters of chronology in a particular region with its own division into periods can substantially be amended by a comparison with outside materials. I should point out that this process is actually happening at the moment with the chronology of the Tagar culture.[21] The series of knives in Arzhan-2 relating to group 2 have numerous analogies in materials from the Saragash phase of the Tagar culture and this once again confirms the necessity of reconsidering the

[20] Chugunov 2011*a*.

[21] Khavrin 2005: 97; Chugunov 2005; 2013.

absolute chronology of Tagar antiquities and relating them to an earlier date.

How long might this funerary-memorial complex have functioned? It seems reasonable to suppose that it was within the confines of a single generation, i.e. about 25 years. It cannot be excluded, of course, that some ceremonies were also held later as part of ritualistic worship of distant ancestors but it can still be asserted that most of the materials in the monument should be dated to the mid-7th century BC,[1] and its later section described in this paper to the last quarter of that century.

[1] Alekseev *et al.* 2005: 84–88, 134–36; Zaitseva *et al.* 2010.

Scythian archers of the 4th century BC: a new archaeological study of excavated bows, arrows and quivers from the northern Black Sea region

Marina Daragan[1]

He breaks off an oak bough
Bends it into a tight bow.
Stretches it with a silky thread
From the cross worn on his breast
Then he cuts stick, thin and narrow
Sharpens it as wispy arrow.[2]

Abstract

Until recently, a detailed database of Scythian bows, arrows and quivers was unavailable. Numerous researchers have published studies of Scythian bows and arrows but these are always based on ancient written sources and images of Scythian toreutics and ignore the huge number of arrowheads, let alone other remains, found in excavated Scythian burials. The present study is the first to draw upon a large sample of bows, arrow shafts, arrowheads and quivers excavated in Scythian steppe burials from the northern Black Sea region. Particular attention is drawn to a perfectly preserved bow found in 1983 with burial 4 in kurgan 8 near Vodoslavka and dated to the third quarter of the 4th century BC: this weapon was sufficiently well preserved to offer important new insights into bow technology and manufacture at this period.

Keywords: Scythian; archery; bow; quiver; arrowheads

Introduction

War played a special role in Scythian life and underlay the considerable militarisation of their society. The Scythian population developed special military formations, unique weaponry and distinctive military tactics in wars against their enemies. Apart from stock breeding, war was the main source of income for Scythians and it was an instrument of diplomatic pressure on their settled neighbours. Scythian warfare has left a historical legacy in the later evolution of military strategies and tactics of warfare, armament and military establishment: the Scythians have entered history as invincible warriors.

The bow was their main weapon and was a highly developed piece of Scythian know-how and its invention was directly related to the development of new equestrian tactics. The emergence of this weapon resulted in a wave of Scythian conquests and military diffusion. At the same time not only the bow, but also elements of defensive weaponry and equestrian shooting tactics were adopted. For any period in the history of war, the situation when the technical characteristics of weapons stipulate the tactics is obvious and, vice versa, the required parameters cause specific tactical tasks by using a particular armament. The bow and arrow in Scythian warfare was an important contribution in all spheres of Scythian life, including their use as symbols or attributes of power, diplomacy, rituals as frequently attested by ancient written sources. These data demonstrate various living and world views of Scythians. Thus the bow was mentioned three times within the context of the legendary origin of the Scythians, arrows were used when calculating the number of Scythians,[4] and in the ritual of swearing

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[3] A. Pushkin, *The Tale of Tsar Saltan*.

[4] Herodotus, *The Histories* 4.81: 'Now, in this same district there is installed a bronze vessel that is at least six times as large as the mixing-bowl at the entrence to the Pontic Sea, the one that was dedicated by Pausanias, son of Cleombrotus. For the benefit of anyone who has not seen Pausanias' bowl, however, I will be more specific: the bowl in Scythia could easily hold the equivalent of 600 amphorae, and is six fingers thick. It was fashioned, so the locals informed me, out of arrowheads. Because their king, who went by the name of Ariantas, wished to know how many Scythians there were, he gave orders that each one of them was to bring an arrowhead [from his own quiver]; and that should anyone fail to do so, then the penalty would be death. A huge number of arrowheads were duly brought, and the king decided to fashion a monument out of them that he could bequeath to posterity. This was the bronze bowl; and after he had made it using the arrowheads, he presented it to this same place, Exampaeus. This is what I heard touching the size of the Scythian population'.

pledges.[5] Arrows were presented as part of a real allegorical message by Scythian kings to the Persian king Darius I Hystaspes (r. 522–486 BC), who invaded Scythian territories with his army at the end of the 6th century BC: according to Herodotus, the message consisted of a bird, a mouse, a frog and five arrows.[6] Researchers have interpreted this as a kind of ultimatum with arrows as a threat of complete destruction of Darius' troops. According to Ctesias, 'the two sides fired arrows at each other and the Scythians prevailed. As a result, Darius took flight and crossed the bridges and in his haste set them adrift before the whole army had crossed'.[7] Plutarch writes: 'a Scythian, while drinking, does not touch the bow and the bow string too frequently, thus calling back his consciousness, fading away due to his inebriety?'[8] Other ancient authors often allude to the poisoning of Scythian arrowheads, and Phylarchus remarks that Scythians even had a proverb that 'our good day appears from the quiver'.[9]

So what do we really know about Scythian bows and archery equipment? Paradoxically, many aspects remain practically unknown despite the extensive number of publications devoted to the Scythian bow. However, we do know its appearance as there are a great number of images on items of Scythian toreutic (Figure 1.1–4), anthropomorphic stelae and coins, and a bronze model of a bow was even found with one of the burials in the cemetery at Olbia (Figure 1.5). There are also clear depictions on vessels from the Kul-Oba, Solokha and Chastye kurgans, as well as on plaques from the Kul-Oba kurgan. According to the images of shooting archers, the bow was short: less than a third of the height of the archer, sigmoid and apparently compact. All of these representations date to the end of the 5th and to the 4th centuries BC.

The following paper reviews and discusses in turn the archaeological evidence for Scythian bows, arrows, arrowheads and quivers, and concludes with a discussion of how this archaeological evidence illustrates the advanced technological development of these weapons and the extent of militarisation of Scythian society.

Bows

Kurgan 2, burial 3 of the 'Three Brothers' group near Kerch in Crimea

For a long time, the main source on the design of the Scythian bow was a sample from burial 3 in kurgan 2 of the 'Three Brothers' group near Kerch in Crimea.. This burial is dated to the second quarter of the 4th century BC.[10] This measures 64.5 cm in length, is 2 cm thick and is composed of three wooden plates,[11] spirally wound with a strip of bark 1.3–1.5 cm wide.[12] At the time of discovery, the bow was found to be straight but after drying it acquired a lightly curved shape. The upper plate at one end is rounded and reduced in thickness whereas the opposite end is thicker and narrows by 0.5 cm; the central plate is rectangular in cross-section, ends on both sides with flat blades, one of which slightly widens. The length of both plates is 58 cm. The third plate is broken on both sides and, like the upper plate, is rounded at one end. The two upper plates are offset by 6.5 cm relative to each other. On the inner surfaces of the side plates there is a longitudinal groove for gluing and there are small oblique incisions on all the planes which had been glued, clearly inded for keying (Figure 2.1–2).[13]

This bow was found in a double burial and placed to the left of the skeleton of an allegedly female skeleton. Near the bow, and the thigh of the deceased, was a quiver containing 52 arrowheads, four of bone and the remainder of copper alloy. The arrow shafts were preserved but all were broken near the arrowheads. The length of their shafts were 30–32 cm. Their ends widen and are provided with notches for pulling the bowstring. The thickness of the shafts at the base is 0.3–0.6 cm but narrows to 0.2–0.4 cm at the end; the width of the notches varies from 0.25 to 0.35 cm. The ends of the shafts near the notches were coloured red, black, white and, in one case, yellow paint. It was possible to distinguish three different colour schemes: the commonest was a red background with transverse black stripes (Figure 2.3–4). At the right side of the second skeleton, which was assumed to be that of a man, there was a quiver with 180 bronze arrowheads.[14]

Fragmented and complete bows of different designs dating to the beginning of the early Iron Age have

[5] Herodotus, *The Histories* 4.70: 'Agreements made on oath between Scythians are sealed by pouring wine into a large earthenware cup, and then mixing it with the blood of those who are swearing the oath – either by jabbing them with an awl, or nicking them superficially somewhere on their bodies with a dagger. After doing this, they dip into the cup a scimitar, some arrows, a battleaxe and a javelin; and then after that they offer up a large number of prayers. Finally, those who are entering into the agreement, together with the most valued members of their retunes, drain the cup'.

[6] Herodotus, *The Histories* 4.131–32: 'the Scythian kings had been informed that Darius was in a desperate way, they sent him a herald bearing gifts: a bird, a mouse, a frog and five arrows'; the Persians interpreted them one way but one disagreed, remarking that '"Unless you should become birds and fly away up into the sky, men of Persia, or become mice and burrow down into the earth, or become frogs and leap into the lakes, you will never make iyt home – for you will be shot down by our arrows"'.

[7] Ctesias, *History of Persia* 12–13.20–21 (Llewellyn-Jones and Robson 2010: 181).

[8] Plutarch, *Lives* 9.44.

[9] Phylarchus, III, fr. 69; Zenon, *Prov. Cent.* VI, 13.

[10] Polin 2014: 281–82.

[11] A wood identification was made of two fragments: in both cases they proved to be maple (Bessonova 2008: 63).

[12] As far as I know, this is only a visual observation.

[13] Bessonova 1973: 247, fig. 6.1–2; 2008: 63; Chernenko 1981: 9.

[14] Bessonova 1973: 246–47.

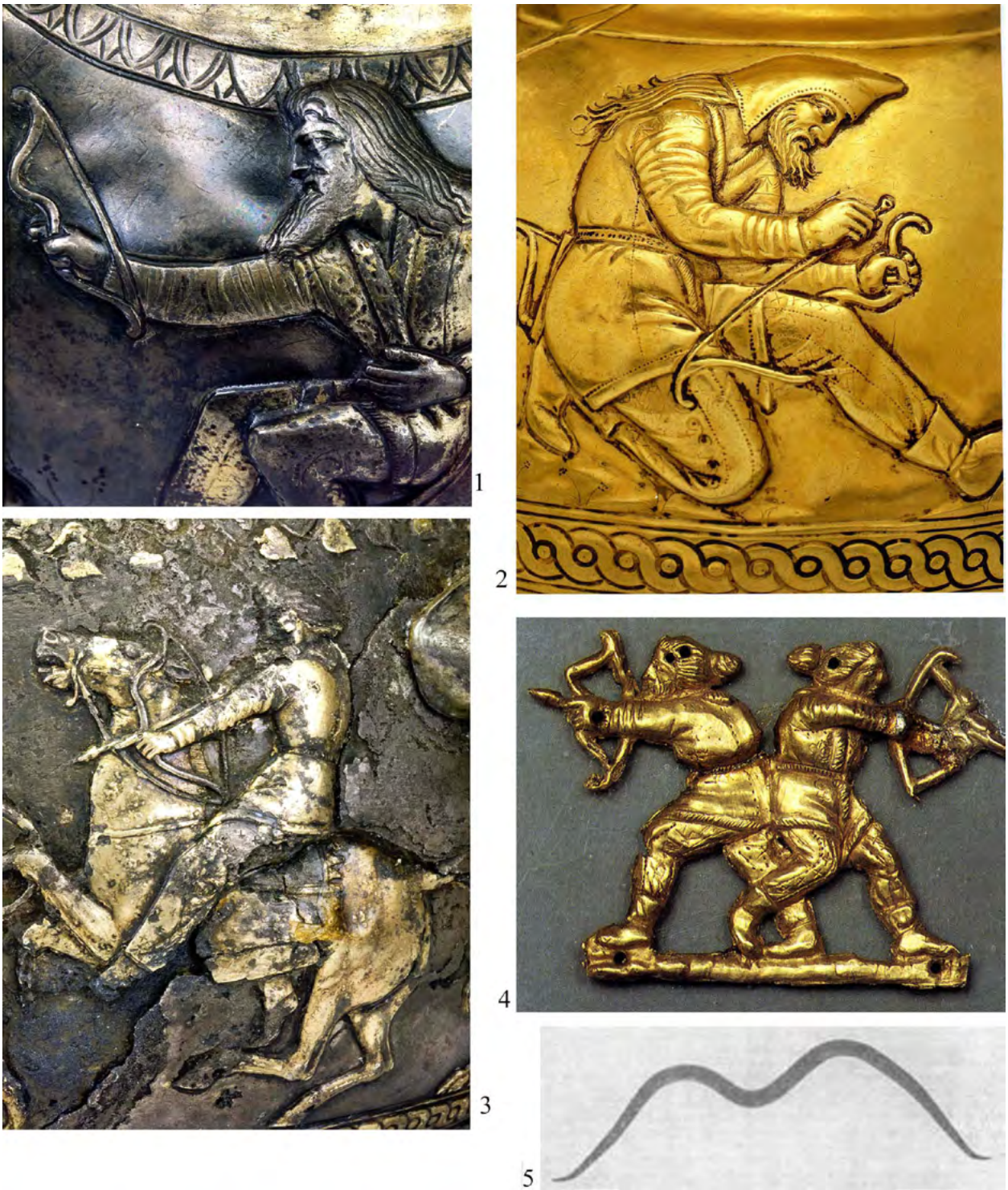

Figure 1. Images of archers on the objects of Scythian toreutics: 1, on a vessel from a kurgan of group 3 of the Chastye kurgans; 2, on a vessel from the Kul-Oba kurgan; 3, on a vessel from the Solokha kurgan (according to Alekseev 2012); 4, on plaques from the Kul-Oba kurgan (Piotrovsky, Galanina and Grach 1986: fig. 199); 5, bronze model of bow from Olbia (Kozub 1973)

been found in recent decades in different parts of Eurasia.[15] Several bows were found in the northern Pontic region, including one in a 4th century BC burial near Vodoslavka village in the Herson region of Ukraine: this is the first complete Scythian bow to be discovered and is therefore described below in detail. Its description is followed by evidence presented from four more burials of the 4th century BC containing fragments or traces of bows which were found during a comprehensive review of all Scythian burials excavated in the northern Pontic

[15] Molodin, Parzinger and Tseveendorzh 2012: 30–31; Yablonsky 2013: 121, no. 1294; Golieva 2011: 43; Morgunova *et al.* 2003: 217.

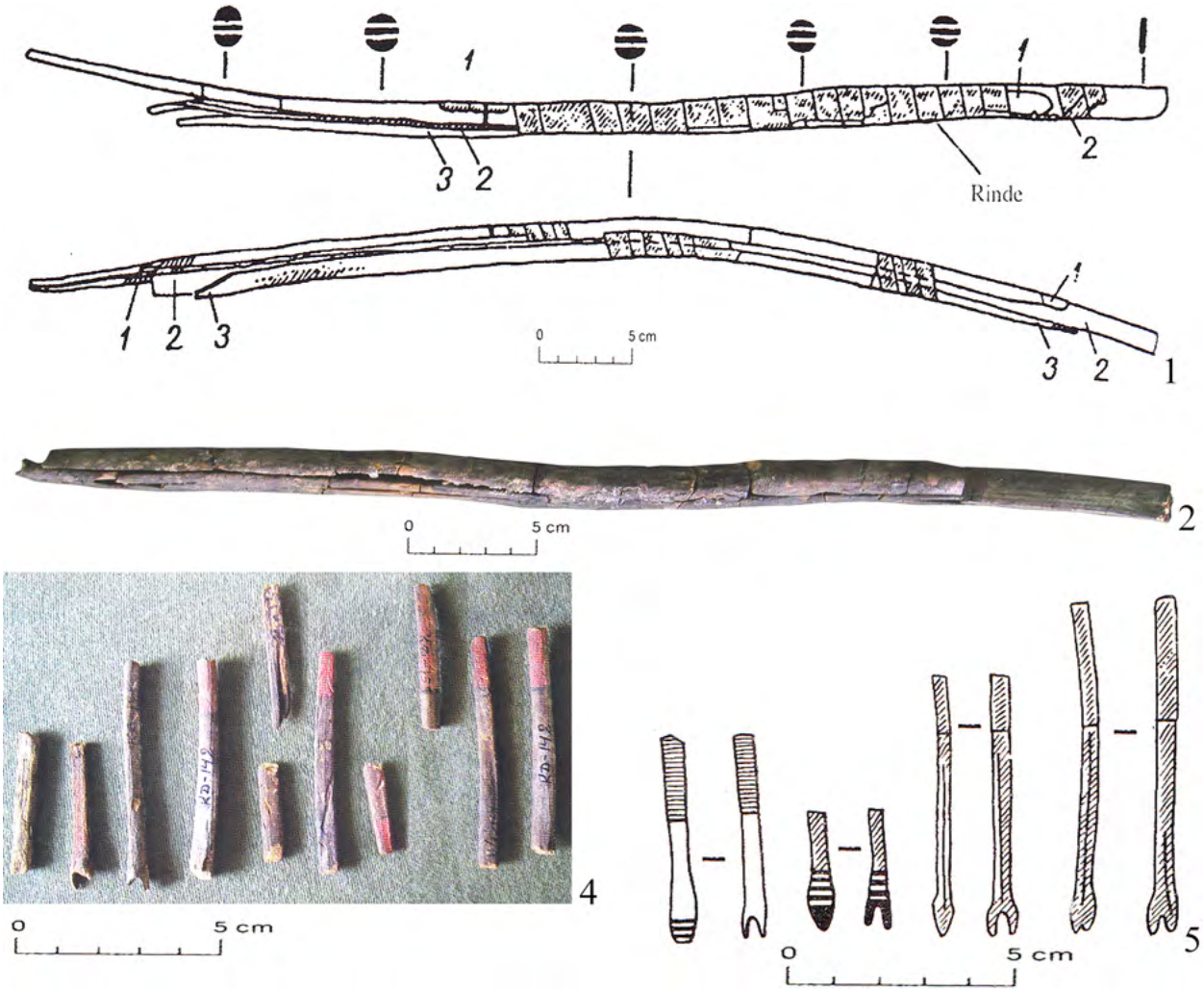

Figure 2. Burial 3, kurgan 2 of the 'Three Brothers' group: 1–2, bows; 3–4, painted arrow shafts (after Bessonova 1973; 2008)

region which date between the 7th and 4th centuries BC.

Kurgan 8, burial 4 near Vodoslavka village (northern Azov region)[16]

This was an intrusive burial in this Scythian kurgan and was sunk to a depth of 4.25 m with a bridled horse buried at the entrance. A young man, possibly a teenager, lay on a central wooden platform covered with leather and cloth (Figure 3). This individual was dressed in leather and fabric clothing, and some shapeless fragments of dark brown leather were all that survived of his boots. This individual wore a single earring in his right ear and two cloth bags filled with herbs were suspended from his neck. He was accompanied by a limited set of grave-goods: at the western wall there was a wooden dish with sacrificial food and an iron knife with a bone handle, while a bow was placed over his body and a leather quiver containing arrows (Figure 4.1) was placed to his left. The quiver also contained a knife lying beneath the arrows. In the area of the right hand (which was not preserved) was a bronze cruciform plaque (Figure 4.3). The burial is dated to the second or third quarter of the 4th century BC.[17]

Only a few fragments of the wooden base and leather cover of the quiver now survive. An image of a griffin was preserved on one of the fragments of skin on the upper part of the quiver (Figure 4.2). There were 88 arrows with bronze arrowheads of two types inside this quiver. Type 1 (totalling 41 specimens) consisted of trilobate heads with a notch at the tip, and arcuate curved lobes and blades which were separated from the protruding socket; a slash mark was preserved above the socket on the top of the face of one of the blades. The length of the arrowheads was 3.70 cm, and they weigh 2.55–3.15 g (Figure 5.1–8). Type 2 (numbering 47 specimens) was

[16] Excavations of Hersonskaya archaeological expedition of the Institute of Archaeology in 1983 (leader of the expedition A.I. Kubishev). The leader of the Vodoslavka team was V.V. Dorofeev; kurgan 8 was investigated by A.Sh. Amirkhanov; cf. Kubishev *et al.* 1983.

[17] Polin 2014: 400.

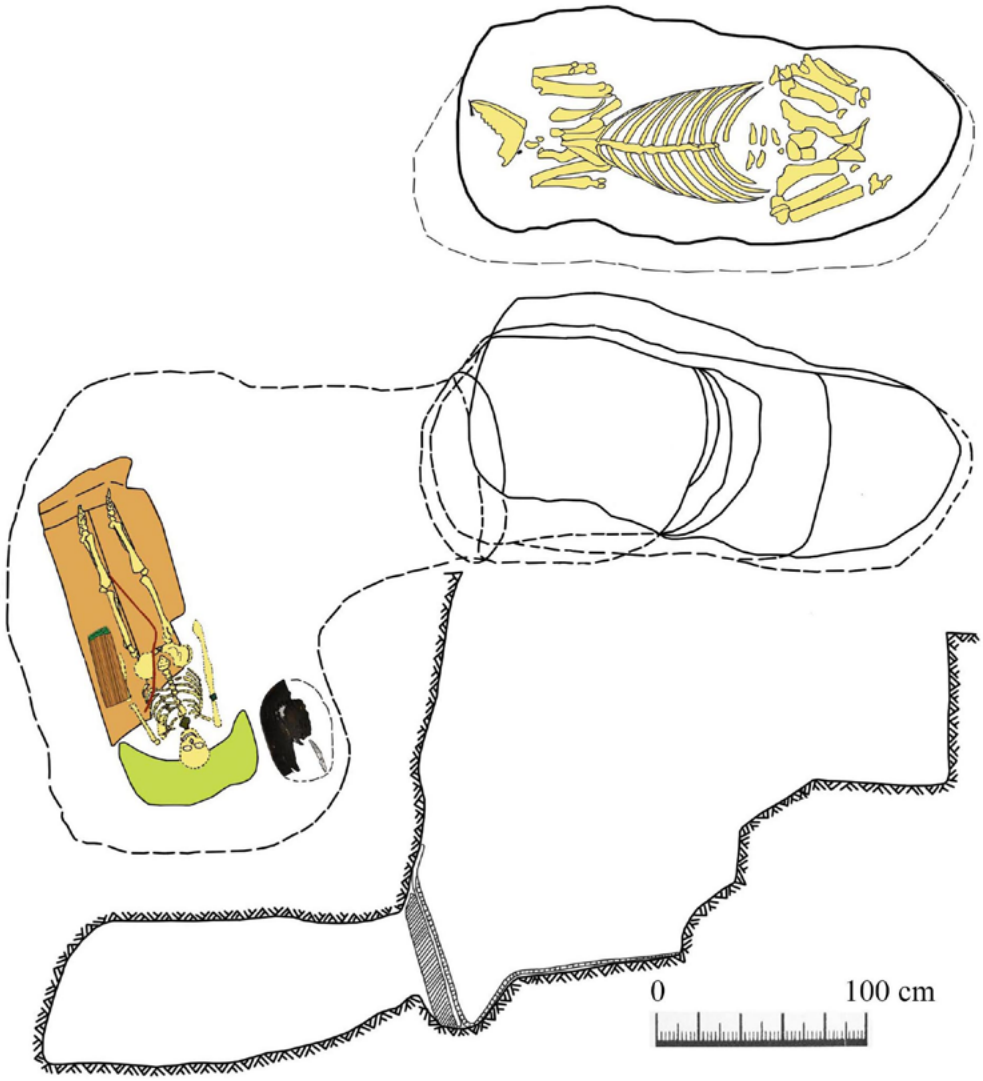

Figure 3. Vodoslavka, kurgan 8, burial 4: plan of the burial (drawing: author)

triangular with a rectangular pyramidal head, a hidden socket 0.4 cm across, a small П-shaped notch at the base of the faces 0.6 cm high and slightly dangling points of the faces below the cutoff of the socket. They measured 2.5–2.9 cm in length, and weighed 2.78–3.33 g (Figure 5.9–16). The length of the arrows in the quiver was 34 cm (Figure 4.5), and red painted marks were visible on many shafts (Figure 4.4).

The bow was almost completely preserved. It was buried with the bowstring removed and therefore in its resting position: the ends of the bow and both shoulders were strongly bent in this opposite direction to that in its drawn state as was confirmed by the location of the notches for the bowstring. It is sigmoid and slightly asymmetric in profile (Figure 6.1–2). T was made of a single piece of oak core,[18] and measured 74 cm in length along the bend; one of the ends is broken but its extant length is 70.2 cm.[19]

The bow has a handle, i.e. the central part of the bow which the archer holds, and shoulders which are the working element of the bow and designed to store energy and deliver its rapid transmission to the arrow. The beginning of the shoulder is the side closest to the handle. The end of the shoulder is the part located closest to the fastening of the bowstring. The belly is the side of the shoulder facing the archer when shooting. The back is the side of the shoulder facing away from the archer (Figure 8). One of the important components of the

[18] Studies carried out at the Department of Technologies and Design of Wood Products of the National University of Bioresources and Environmental Management of Ukraine by the head of the department, Doctor of Technical Sciences, Professor A.A. Pinchevskaya found that on the cross-section of a whole sample of wood from which the bow is made, the accumulation of small characteristic vessels in the late zone In the annual layer is indicative of oak. It can be assumed that this is a young oak tree, because it has more elastic vessel walls and can be flexed. It is very interesting that the early zone of the annual layer of oak, from which the bow is made, is approximately 4-5 times smaller than the late one (in modern oak it is two times smaller), which indicates the harsh climate of the 4th century BC..

[19] In modern storage, one of the ends of the bow is missing, and the end is broken off on the other side. There are also nicks in the centre, probably the wood was taken for analysis, but it is unknown whether they were made and where the missing parts of the bow are.

Figure 4. Vodoslavka, kurgan 8, burial 4: 1, quiver with arrows, graph *in situ*; 2, fragment of quiver; 3, bronze plaque; 4, arrow; 5, preserved arrow endings with marks (photographs: author)

bow – its bowstring – was not preserved. The shape of the bow is asymmetric, as the lower shoulder is longer than the other, proving this to be a bow with upper and lower shoulders. The length of the long shoulder is 41 cm, the short one is 33 cm. At the same time, the short shoulder of the bow is thinner, while the longer one is thicker. At a distance of 26.77 mm from the edge there is a П-shaped notch for securing the bowstring: this notch is 10 long and 3.7 mm wide, and there are clear signs of the bowstring (Figure 7.1).

X-ray examination and computed tomography (CT) scans were carried out to study the geometry and design of the bow in detail (Figure 6.3, 9), and by utilising the CT scans it was possible to reconstruct the bow, based on images in different planes, obtain a three-dimensional model of it and obtain a better understanding of its design. The parts of the bow have different thicknesses and different cross-sectional shapes: the wooden arc of the handle is oval in section, as is the short shoulder, whereas the long shoulder in the portions closer to the handle has a triangular section; the back is straight, the belly is narrow but closer to the point of

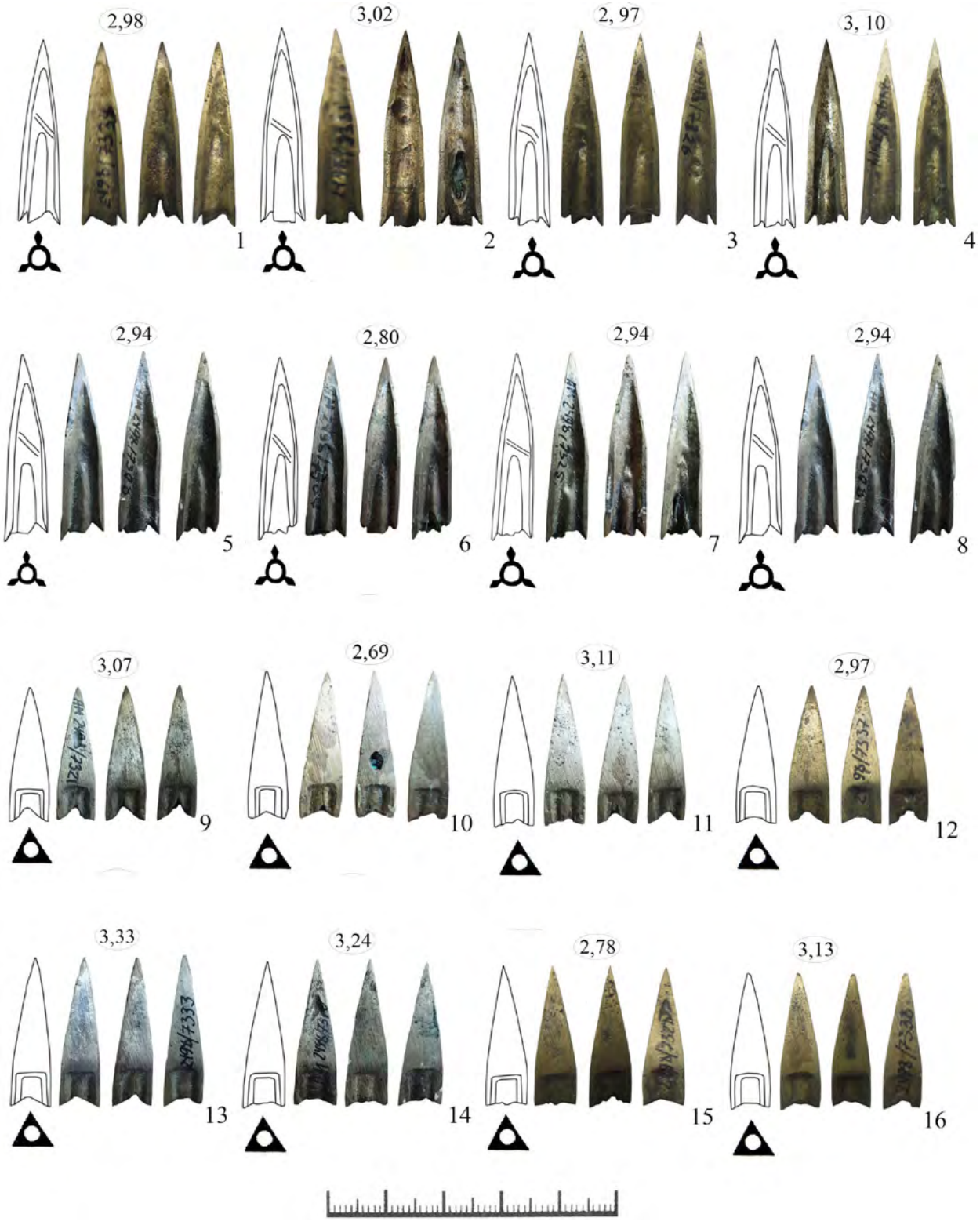

Figure 5. Vodoslavka, kurgan 8, burial 4. Arrowheads; 1-8 – type 1; 9-16 – type 2
(drawings and photographs: author)

attachment of the bowstring it has a straight belly and a sloping rounded back. At the point of attachment of the bowstring, the shoulders of the bow are flattened and have a rounded triangular cross-section (Figure 6.2). The dimensions from the beginning of the long shoulder are as follows:

- the handle from the side of the long shoulder next to the gluing: 7.72 mm thick, 13.71 mm across at the back; on the belly, 13.45 mm at the belly;
- the long shoulder (average): 13.91 mm thick, 12.96 mm across at the back, 11–12 mm at the

Figure 6. Vodoslavka, kurgan 8, burial 4 wooden bow showing its shape before pulling the bowstring: 1, photo; 2, drawing (by O.E. Buravchuk); 3, X-ray image (imagery: author)

belly; in different places to the centre it was 13.71–11.20 mm thick;

- the long shoulder at the area near the notch for the bowstring: 12.86 mm across at the back, 11.16 mm at the belly, 5.43 mm thick;
- the handle from the side of the short shoulder: 7.61 mm thick, 11.49 mm across at the back, 10.09 mm at the belly;
- the short shoulder (average): 7.25–6.13 mm thick, 10.00–13.09 mm across at the back, 12.10–9.05 mm at the belly

It must be emphasised that such a short wooden arc with four curves cannot withstand stress. When flexed, the shoulder to some extent will spring and after overcoming the threshold will break as the wood simply does not have enough elasticity, and in the end the tensile stress will destroy the back of the bow.

When making the bow, it was necessary to take into account the structure of the wood and the way it was prepared. We have already found that the bow had been made of oak: in the northern Pontic region this was the densest, most resilient and moisture-resistant material.

The density of the wood measured using the CT is 814 HU. The sample used for the bow has broad cord-like rays directed along the fibres. When squeezed along the fibres, the deformation is expressed as a small shortening of the sample. At the same time, the strength of the wood when compressed along the fibres will be about eight times higher than when compressed across the fibres, thus to increase the flexibility of the shoulder, the wood needs to be strengthened by using reinforcing materials which have a greater amount of elasticity.

When pulling the bowstring, the back, i.e. the outer side of the bow arch, is under tensile stress (this is the stretch side), while the inside or belly is compressively loaded. The bow has to be able to withstand the impact of these forces so as not to break when making a shot. In order to give the bow greater elasticity and strength, a thin plate of wood or fruit tree bark – most likely wild apple or pear, both medium-density species – was attached to the belly (Figure 7.2). This addition was partly preserved as a strip measuring 4.54 mm wide and 3.24 mm thick. It was most likely glued onto the bow using a mastic

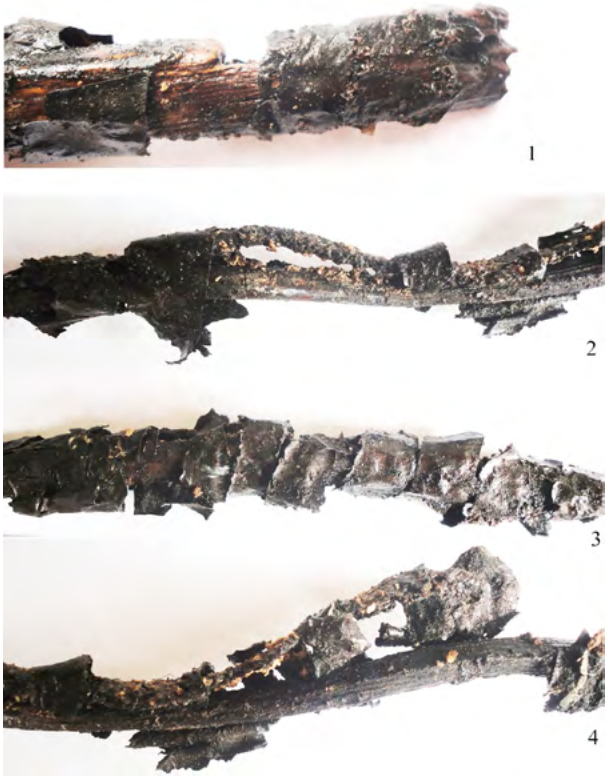

Figure 7. Vodoslavka, kurgan 8, burial 4: photographs of separate parts of bow (photographs: author)

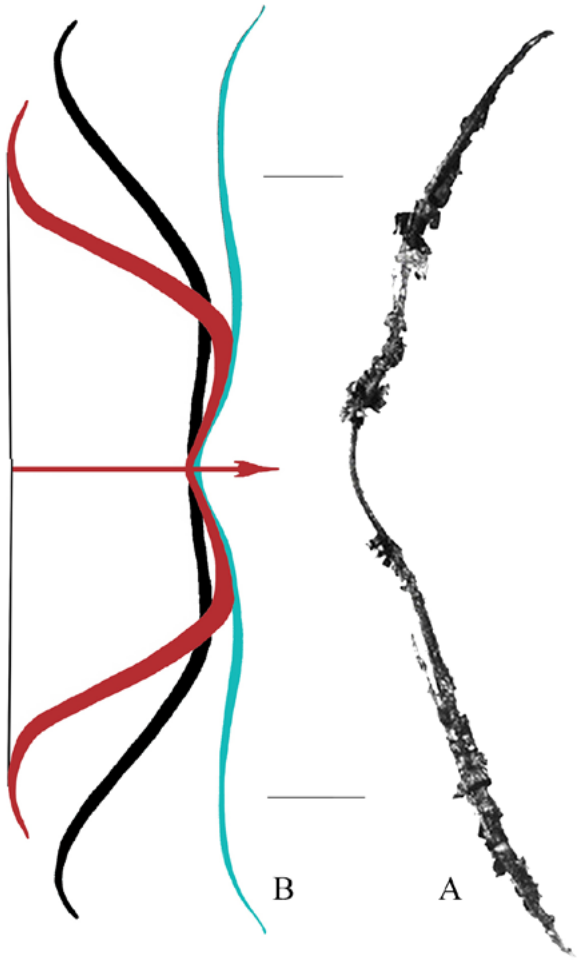

Figure 8. Vodoslavka, kurgan 8, burial 4, scheme of bringing the recurved Scythian bow into firing position: a, the shape of the bow before pulling the bowstring; b, in the process of pulling and with stretched bowstring (imagery: author)

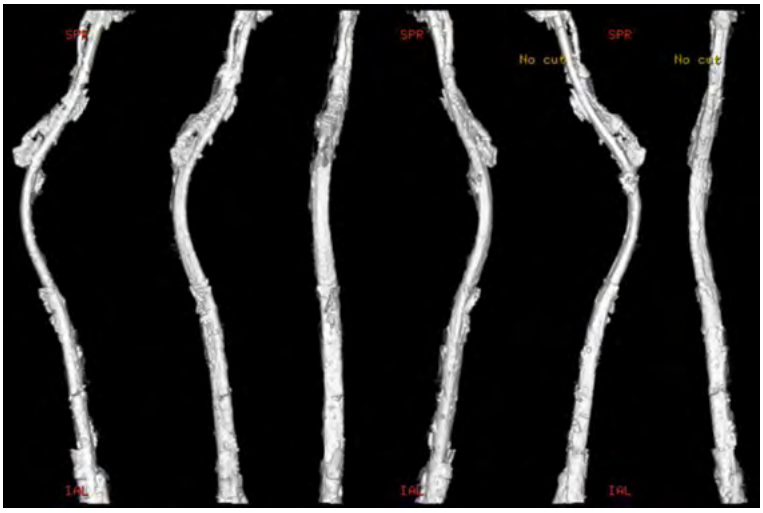

Figure 9. Vodoslavka, kurgan 8, burial 4: three-dimensional computed tomography scan of the middle part of the bow (imagery: author)

made from sturgeon swimming bladders. The bow was screw-wound with layers of tendons along the entire length (Figure 7.3–4). These tendons took the form of a ribbon with a width of 18.09–10.15 mm and 0.29 mm in thickness. According to the CT scan, their density is 430 HU. During the screw-like pasting of the bow, the tendon edges lapped and overlapped with the following coils. As the glue dried, these intertwined tendons formed a uniform vitreous cover designed to maintain the plasticity of the bow. It should be noted that the layer of tendons was least well preserved on the handle.

Tendons have a high tensile strength, i.e. work on stretching and our bow was strengthened by tendons on the belly, back and sides, but since the greatest tension when shooting arises exactly on the back, the main thing is that this design greatly strengthened the back. In addition, the presence of a tendon cuff along the entire length of the bow made it possible to significantly shorten its arc without affecting the length of tension. The elastic energy of the tendons exceeds the ultimate elastic energy of any wood: as the bow is entirely of wood and made of oak, it is hard but when it bends the tendons stretch and thus prevent the bow from breaking. To this, we should add that the fruit-tree plate glued to the belly also contributed to the stiffness of the bow. This combination of various flexible and resilient materials in the design of the bow from the Vodoslavka kurgan allowed the bow with short shoulders to impart more energy to the arrow than a simple bow construction.

The most interesting feature in the shape of the bow is the fact that it is reflexive, that is, pre-stressed due to the slight curvature of the shoulders in the opposite direction to that of the attached string: such a bow is known as a recurved bow. There is no need to explain that the power of the reflexing bow was much higher than that of the conventional one, which had no pre-stress. Since the bow was bent in the direction opposite to the shooting position, one had to apply a lot of force in order to stretch the string onto it. In fact, this is a relatively simple and effective solution to make a hard yet flexible bow with the minimum amount of available material. The Vodoslavka bow is an ideal short bow for the rider and it is unsurprising to therefore find that a horse was buried in the entrance pit of the grabve where the young archer was buried.

The kurgan near Vladimirovka village, burial 4 (eastern part of western Sivash area)

The body of a teenager aged 10–12 years at death was placed in this tomb. Traces of the decaying quiver, bow and five wooden arrows measuring about 40 cm long with leaf- and trihedral arrowheads were found to the

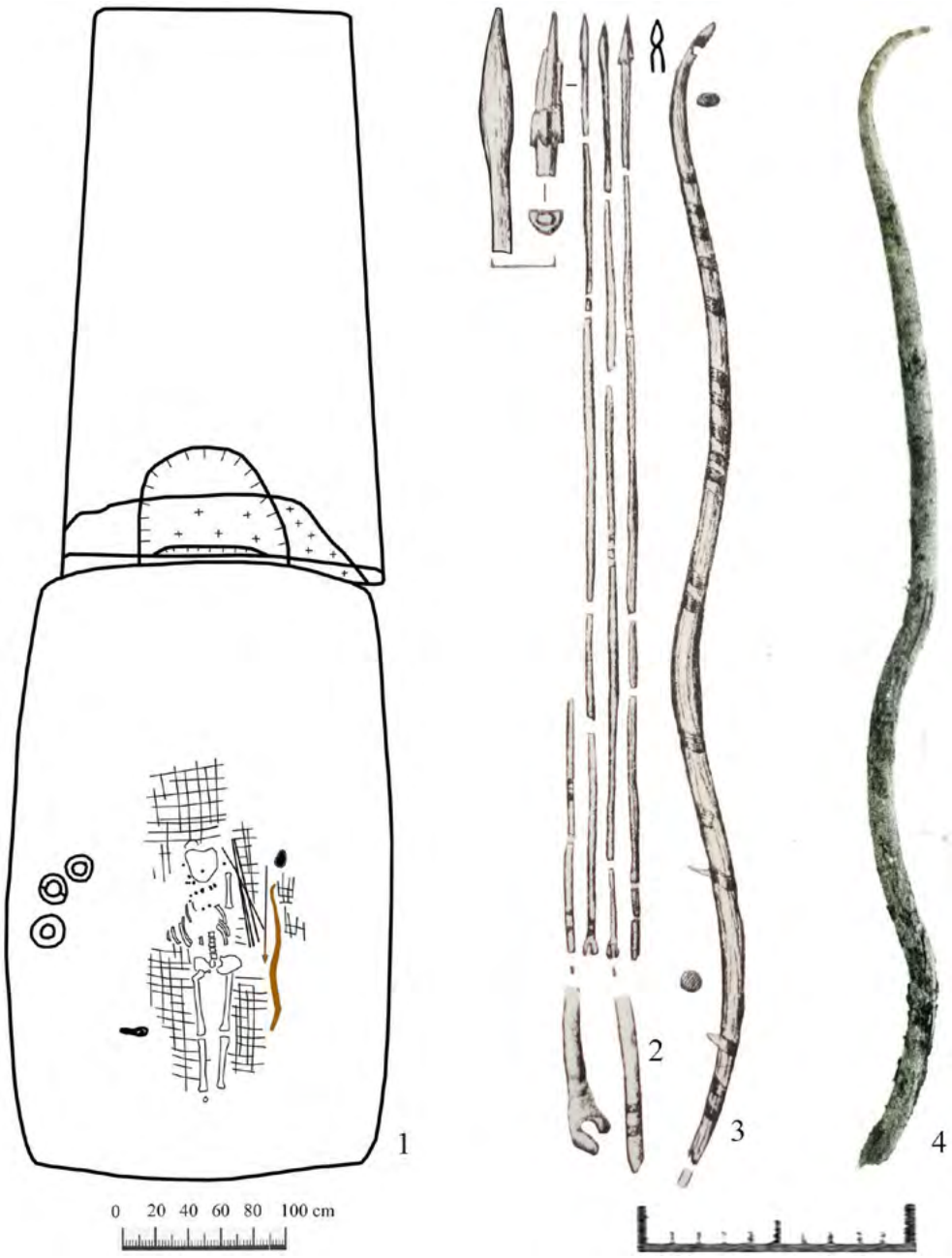

Figure 10. Vladimirovka, burial 4: 1, plan; 2–3, wooden arrows and bow, drawing; 4, wooden bow, photograph (after Kolotukhin 1987)

left of the human remains (Figure 10.1).[20] The bow was laid next to the arrows. It is whole-wooden, asymmetric and sigmoid in shape. The present length is 48.9 cm; the original length was assumed to be 55 cm but, judging by the curve of the bow on the preserved photograph, its length should be 15–20 cm longer and therefore it should have been 70–75 cm in length.[21] A groove for fastening the bowstring was cut on the preserved end of the bow. Spiral winding was preserved in fragments throughout the perimeter of the bow, made of a leather (tendon?) strip of 0.8-1.0 cm wide. The wooden handle of this bow has a variable cross-section. One shoulder is oval-flattened, the other one is round (Figure 10.2–4). The bow was placed with the bowstring removed, as proven by the location of the grooves for the bowstring on the reverse side of the bent ends of the bow. The burial is dated to the second quarter of the 4th century BC, as well like that from Vodoslavka.[22]

Brilyovka kurgan 22, burial 2 (lower Dnieper area)

This was the burial of an adult man. Two quivers and a bow were laid alongside his left side: the first quiver lay by his shoulder, the second by his hand and the bow placed on top of the lower quiver (Figure 11.1).

[20] Kolotukhin 2000: 14; Koltukhov 2012: 49, fig. 20.2,4.
[21] Kolotukhin 1987: fig. 91.1.
[22] Polin 2014: 418.

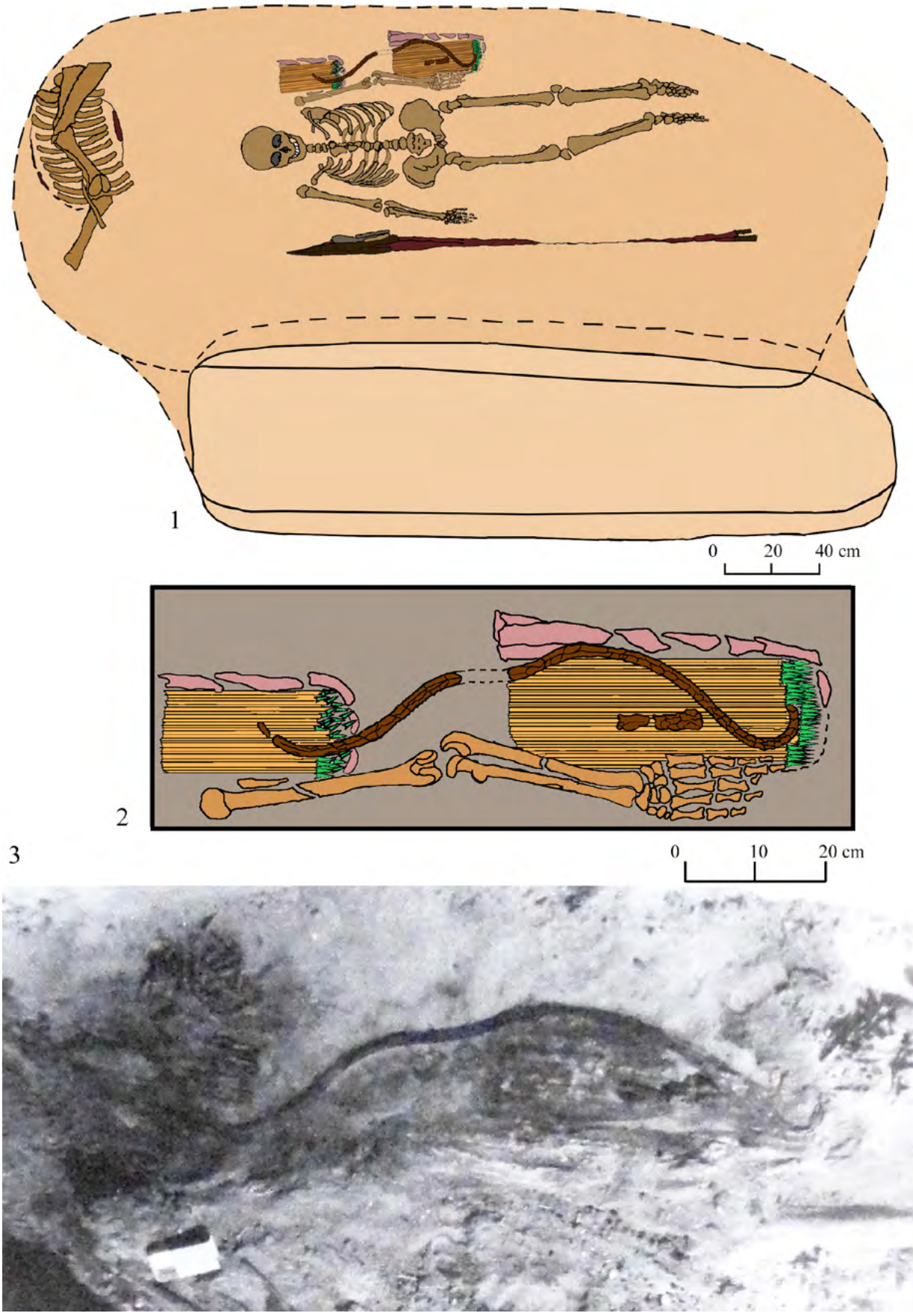

Figure 11. Brilyovka, kurgan 22, burial 2: plan and photograph
(after Yevdokimov, Gershkovich and Fridman 1985,
drawing by O.Ye. Buravchuk)

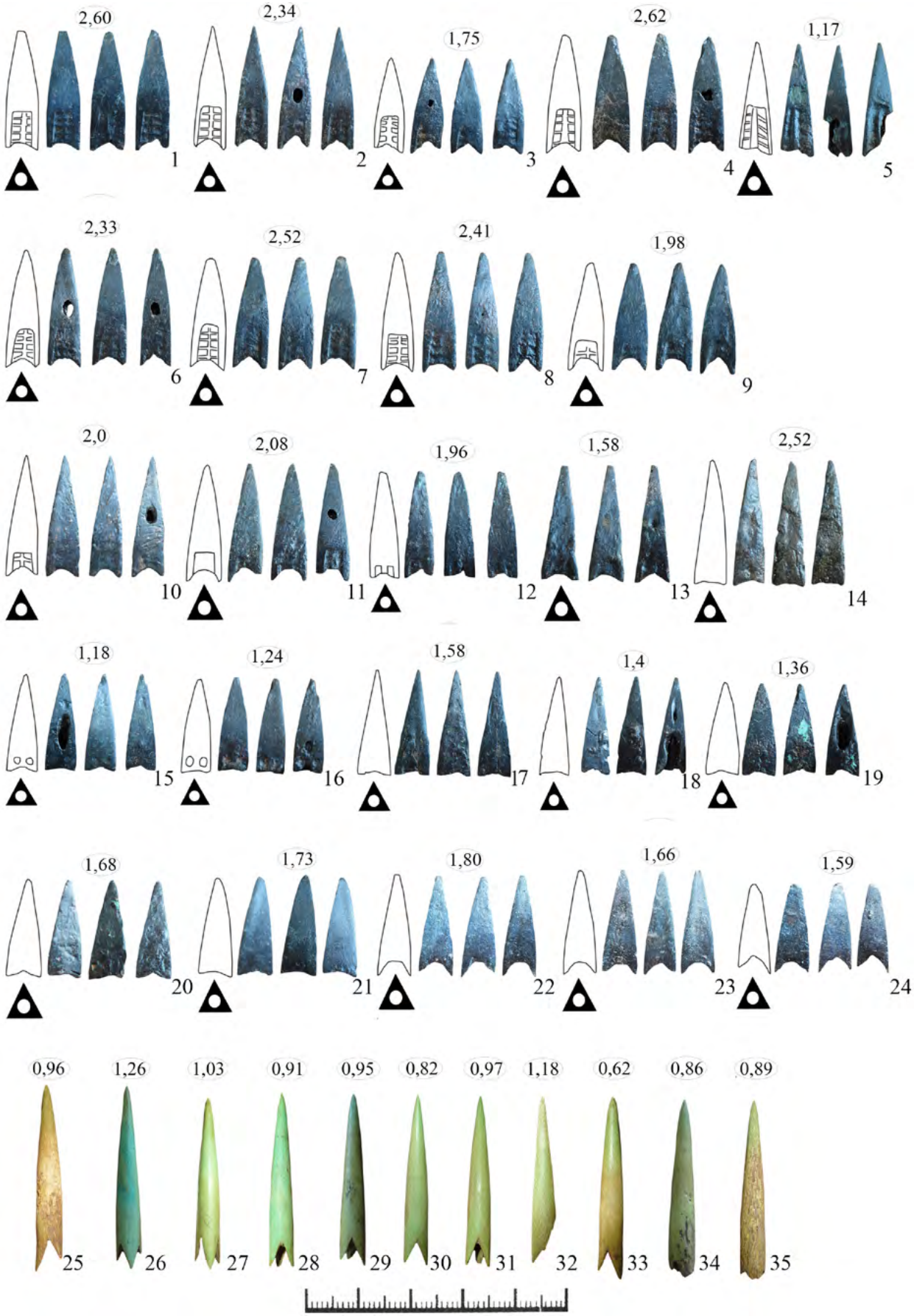

Figure 12. Brilyovka, kurgan 22, burial 2: arrowheads from the quiver 1: 1-24: bronze, 25-35: bone (drawings and photograph: author)

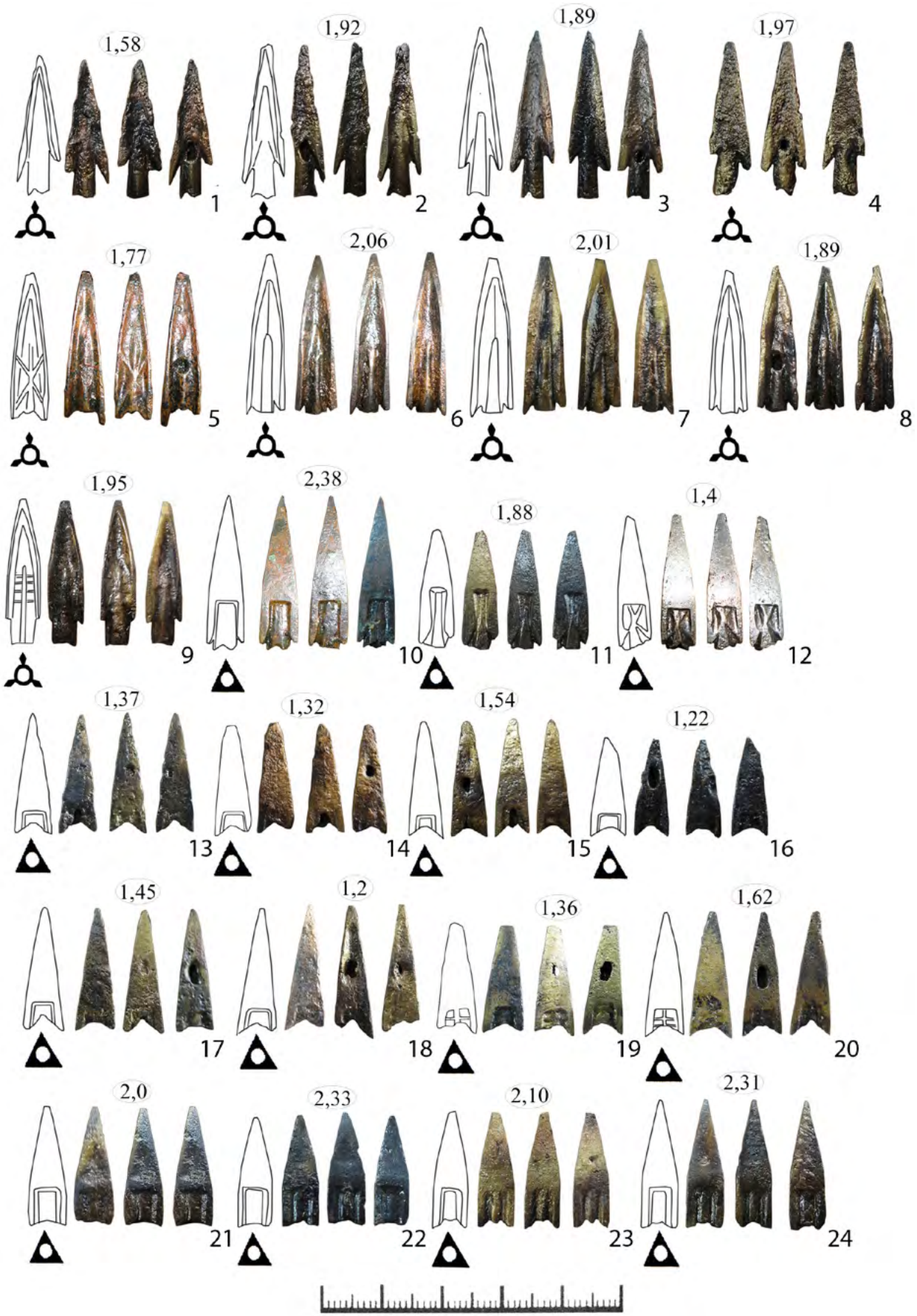

Figure 13. Brilyovka, kurgan 22, burial 2: arrowheads from the quiver 2
(drawings and photograph: author)

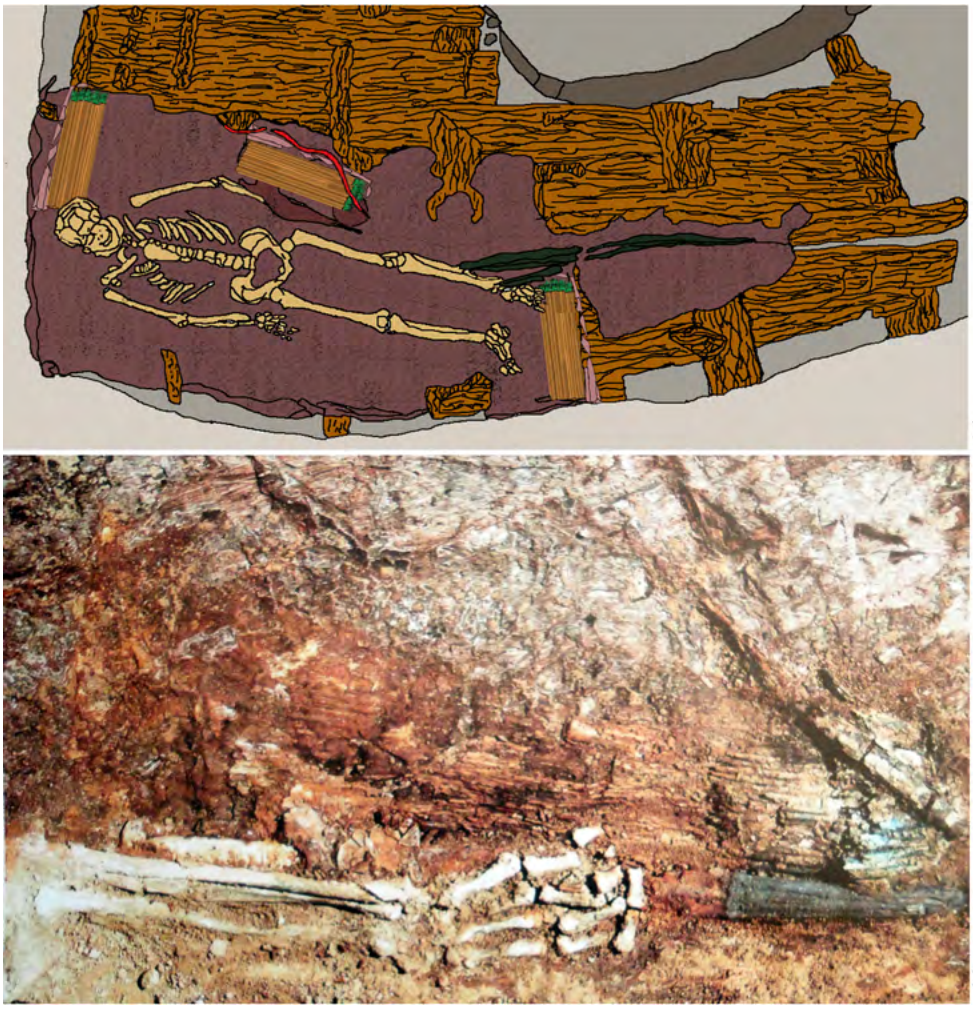

Figure 14. Ryzhanovsky kurgan: 1, arrangement of bow and quivers on the plan: the quivers had not been drawn on the plan but were plotted according to the description in the text (after Skory *et al.* 1999, drawing by O.Ye. Buravchuk); 2, bow and quiver in the photograph (after Chochorowski and Skory 1997: fig. 7, pl. 8)

The bow is again whole-wooden, asymmetric and sigmoid in shape. It was interred in a firing position with the bowstring tightened. The length of the bow in this position was 75 cm, the diameter of the arc at the handle was 2–2.5 cm (Figure 11.2).[23] In the first quiver there were 18 bone arrowheads and 51 bronze triangular arrowheads of six types (Figure 12). The set of the second quiver included 119 bronze arrowheads of nine type, both three-lobed and trihedral (Figure 13). This burial is dated to the first half of the 4th century BC.[24]

Ryzhanovsky kurgan (right bank Ukrainian forest-steppe)

The burial was placed in the catacomb and belonged to that of a man aged 45–50 years at death. In addition to a very rich and diverse inventory of grave-goods, this individual was also accompanied by a bow and three quivers. The first of these contained 94 arrows with 59 trihedral and 35 trihedral arrowheads and was laid to the left of the body and a bow placed on top (Figure 14.1). The bow is whole-wooden, asymmetric and sigmoid-shaped. This bow, like that from Vodoslavka, was made of oak and was placed in a firing position with the string tightened (Figure 14.2). The length of the bow was 70 cm. The second quiver was laid near the head of the buried man and contained 85 arrows, and the third was laid at his feet and contained 87 arrows.[25] This burial was dated to the third quarter of the 4th century BC.[26]

Vishniovka (Crimean Azov area)

Together with these bows, one should also mention a possible fragment of bow found in this burial dating to the second half of the 6th century BC. Several fragments of oak were found on the right side of the quiver under the arrow shafts: the largest was 8 cm long, 1.2 cm in diameter and bent in the centre by 1 cm, consisted of three plates and covered with bark.[27]

[23] Yevdokimov, Gershkovich and Fridman 1985: 74–75.
[24] Polin 2014: 390.
[25] Skory *et al.* 1999: 98–99; Chochorowski and Skory 1997: fig. 7, pl. 8.
[26] Polin 2014: 503.
[27] Andrukh 1988: 167.

Kurgan Soboleva Mogila burial 2 (lower Dnieper region)

In addition to the above, the number of bows in Scythian burials should include the discovery in this intrusive burial. The buried man was accompanied by a rich inventory, including a *gorytos* lying below the lower part of his left hand and along his thigh, from where the composite gold coating was preserved. The total length, i.e. height, of the *gorytos* was 59 cm judging from the arrangement of the gold plaques which had been attached to it. The width in the upper part was up to 32 cm, in the lower part up to 20 cm. The length of the pocket for the arrows did not exceed 36 cm, whereas the arrows were up to 34 cm in length (Figure 15.1). 46 bronze arrowheads were found packed in a special pocket inside the *gorytos*, on its bottom: all were of a single type, elongated three-lobed with notches to the tip, a slightly protruding socket with sharpened tips of the lobes at the level of the socket or lowered slightly below. There was a tamga in the form of short relief strip on one notch. The length of the arrowheads varied from 4.0–4.2 cm (Figure 16.17–19). Short fragments of wooden shafts up to 2 cm in length and about 3 mm in diameter were preserved in the sockets, and one retained a narrow band painted with red paint.[28]

Figure 15. Soboleva Mogila, burial 2: 1, *gorytos*; 2, bow plate (after Mozolevsky and Polin eds 2005)

In the centre of the upper part of the *gorytos*, among the plates of the cover, was a gold plate wrapped in a tube which covered the handle of the bow.[29] The cover of the bow handle was a gold rectangular ornamented latticed plate folded into a tube. The plate was attached to the handle with silver nails passed through five holes. The dimensions of the plate were 10.0 x 5.9 cm (Figure 15.2); the diameter of the folded cover was 2.7 cm.[30] The bow was not preserved but the reconstructed length was about 78 cm.[31]

In addition to the *gorytos*, five more quivers were placed with the burial: in quiver 1 there were 64 bronze arrowheads of five types (Figure 16.1–6), 37 socketed trihedral arrowheads of two types in quiver 2 (Figure 16.9–13), 36 more of the same in quiver 3 (Figure 16.7–8), 21 bronze socketed three-lobed arrowheads in quiver 4 (Figure 16.14–16), and 32 bronze socketed trihedral arrowheads of the same type in quiver 5 (Figure 16.20–21). Red (in the form of a narrow ring band 1 mm wide) and black paint remained on some arrow shafts from different quiver sets.[32]

This burial was dated to the third quarter of the 4th century BC.[33] It is significant that two types of arrowheads from quiver 1 of burial 2 in the Soboleva Mogila kurgan (Figure 16.1, 5) and the bronze cruciform plaque found in one of the quivers[34] are identical to those found in burial 4 of kurgan 8 near the Vodoslavka village (Figure 4.3).

[28] Mozolevsky and Polin eds 2005: 181, fig. 101, 17–19.
[29] Mozolevsky and Polin eds 2005: 158–59, figs 98, 98, 99, 99a, table 5.3–4.
[30] Mozolevsky and Polin eds 2005: 181, tables 18, 2.
[31] Mozolevsky and Polin eds 2005: 349.
[32] Mozolevsky and Polin eds 2005: 187–88, fig. 101.1–21.
[33] Polin 2014: 478.
[34] Mozolevsky and Polin eds 2005: fig. 104.8.

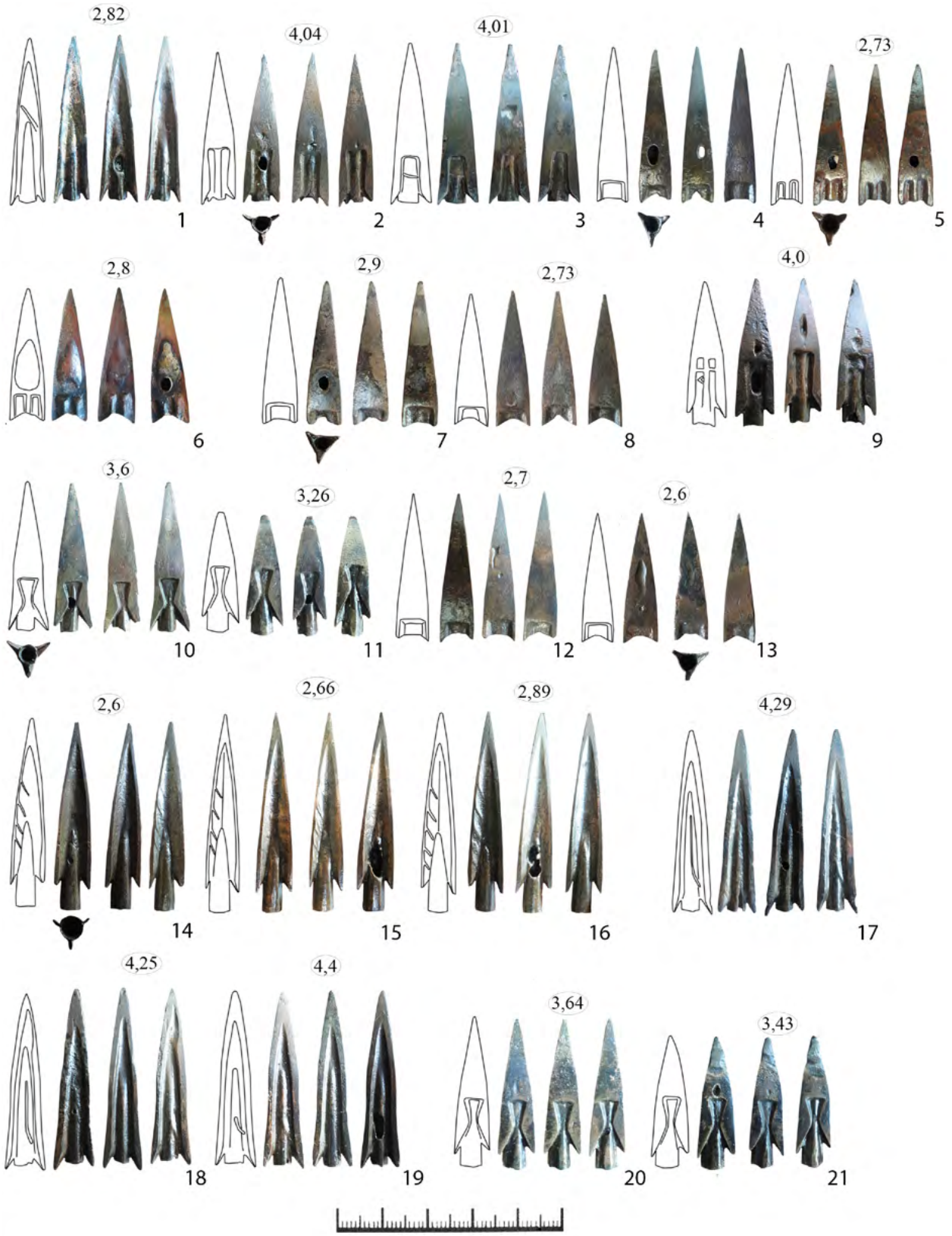

Figure 16. Soboleva Mogila, burial 2. Bronze arrowheads. 1-6 – quiver No. 1; 7.8 – quiver No. 3; 9-13 – quiver No. 2; 14-16 – quiver No. 4; 17-19 – gorytos; 20, 21 – quiver No. 5 (after Mozolevsky and Polin eds 2005)

At present four Scythian bows of very similar or identical design are known from Scythian burials of the 4th century BC in the northern Pontic region. All are whole-wooden, sigmoid-shaped and recurved. Tendons and bark were used as the reinforcing materials in their design. The bow from Ryzhanovka, as well as the bow from Vodoslavka, was made of oak. Bows were found in ordinary burials, as well as in an elite burial

at Ryzhanovka, and the deceased were found to be of different ages. The gold bow cover found in burial 2 of the Soboleva Mogila kurgan illustrates a tradition of decorating elite bows. Bows of different design – if they were indeed bows – were found in the 'Three Brothers' kurgan in Vishnevka and consist of several glued wooden plates reinforced with bark or tendons.

The prevalence of such tight Scythian bows, similar to that from Vodoslavka, is most clearly illustrated on Scythian toreutic, in particular on a vessel from the Kul-Oba kurgan. The craftsman who made this succeeded in showing the great skill required to pull the string the bow. In this case the Scythian warrior, crouching on his right leg, rested the lower end of his bow against his thigh while his straight left leg restrained the lower shoulder of the bow, and in his right hand he holds the bowstring ending with a loop. As one end of the bowstring was fixed on the bow, the man has to bend in order to put the loop on the opposite end (Figure 1, *2*). Looking at this picture we can conclude that the bow was very tight and required not only strength but also skill to bring it into a firing position. It is also important to emphasise that the metric parameters of the bows depicted on the vases coincide with those bows found in the burials. The asymmetry is also clearly shown as there is a more heavily curved short upper portion and a long less curved lower portion.

The study of the whole number of Scythian burials of the northern Pontic region also allows us to refute one of the myths about the design of Scythian bows, namely, that they used bone lining. To date, no bone findings, which could be correlated with reinforcing lining on the bow, have been identified in the Scythian burials of the 5th–4th centuries BC in the northern Pontic region.

Equally, the study of the entire number of Scythian burials in the northern Pontic region confirms the extremely rare occurrence of bows in the burials, which, of course, can not be explained only by their poor preservation. There were no bows in a number of burials, where, for example, the organic parts of quivers were preserved. E.V. Chernenko attributed this situation to the material value of the bow, and also to the fact that bows, which occupied a special place among Scythian weapons, could be inherited.[35] The complicated design of the Scythian bow – the whole-wooden recurved device with additional reinforcing elements – demonstrates the high value of such a bow in the sense that making such a bow took a very long time. It is known that, for example, a master-crafted Mongolian bow took several years to make,[36] and it is believed that Turkish bows also took about three years to make.[37] There were no additional bone reinforcing linings on the bows from the northern Pontic Scythia, whose fastening took a very long time yet the preparation of wood through digestion, evaporation, drying, etc. also took time although we can only guess exactly how long this required.

It can be noted that in the eastern part of the steppe belt of Eurasia in the 5th–4th centuries BC at least in the steppe Urals, the bows of similar dimensions and design were used – both whole-wooden and made of several wooden plates glued together, reinforced with the tendons and the bark, but also without additional lining made of bone or horn. A whole wooden bow lay in the burial 2 of the Linevsky kurgan, in the back pocket of the *gorytos*. A fragment of a curved shape about 45 cm long was preserved. The bow had a square in section, straight middle part and S-shaped curved shoulders. A hook for fastening the bowstring is cut out at the preserved end.[38] A whole wooden bow, made of elm, was found in a special pocket of *gorytos* in burial 3 of kurgan 7 from the Shumayevski I kurgan cemetery. The lower part of it is preserved, 14.5 cm long and 2 cm in diameter. The bow was wrapped in tapes made of wool and leather. Its end had a ledge (0.8 x 1 cm) for fastening the bowstring.[39] There were two fragments of bow 9.5 and 7 cm long and 2 cm thick in the back pocket of *gorytos* found in burial 1, kurgan 1, Akoba burial ground. The bow consisted of two coupled together wooden plates, wrapped by spiral with leather tapes. The bow had an oval-shaped cross-section with axes 6 and 13 mm. The dressed animal skin was glued over the tapes, with fur facing outwards with a perpendicular arrangement of the direction of the fibres relative to the leather tapes. There were ledges of 2 cm in length and 1.3 cm in diameter for fastening the bowstring on the ends of the bow. The fragment of the bowstring fixed on one of the ledges was well preserved.[40] The bow was found in burial 5 of kurgan 4 Filippovka-1 cemetery. The bow was sigmoid, the middle part of the handle had arcuate concave shape. The ends are sharpened and rounded. The total distance between the ends is about 60 cm, the diameter at the ends is about 14 mm. The cross-sections of the end thirds of the shoulders had subquadratic shape with a side about 18 mm. The middle part of the handle is round in cross-section with a diameter of about 20 mm. The bow was made of elm.[41]

Arrows

The ability of the bow to deliver its energy to the arrow depended on the weight of the arrow. A heavy arrowhead and the tail which acted as a brake is needed for stable arrow flight: increasing the weight

[35] Chernenko 1981: 17.
[36] Nefedov 2008: 489.
[37] Litvinsky 1966: 59–60.
[38] Meshcheryakov 1997: 47, fig. 7.1; Kraeva and Kuptsov 2007: 30.
[39] Morgunova *et al.* 2003: 217.
[40] Morgunova and Kraeva 2012: Fig. XII; Kraeva and Kuptsov 2007: 34, fig. 1.5.
[41] Golieva 2011: 43; Yablonsky 2013: 121, no. 1294.

of an arrow leads to a decrease in initial velocity and consequently a decrease in kinetic energy. The arrow must be balanced, i.e. the weight of the arrowhead must correspond to the weight of the shaft which can be achieved by the correct placement and dimensions of the fletching. The balance also involves the correct determination of the length and weight of the shaft but in order to have a high flight velocity, the arrow should be lighter and this modification was indeed made.

We can map clear changes in the weight of the arrow by changes in arrowhead weight during the Scythian period: arrowheads of the 4th century BC weigh two or even three times less than arrows of, for example, the 7th century BC.[42] Reducing arrowhead weight leads to a shortening of the arrow and to changes of the bow design as it became stiffer and the tension force changed. Thus, the heavy arrowhead most likely corresponds to a large bow with a long arrow with a fluffy tail. This is the case for a slow-moving but far-reaching arrow whereas if the arrowhead is light, the arrow is shorter, the bow is smaller and stiffer, and the tail smaller or even completely absent. In other words: if bows are stiffer, the arrow is shorter, the weight of the arrowhead is lighter and the tail is smaller as there is reduced requirement for a braking and stabilising component. Such an arrow will fly faster. Heavy arrows had a steeper flight trajectory but maintained a longer kill power. The arrows with light arrowheads flew faster along a more direct trajectory, oscillated less and therefore hit their targets more accurately, whether stationary or moving. A phrase from the 15th century treatise on *Arab Archery* is noteworthy in this regard:

> 'Skilful archers avoid using heavy arrows because of their many vices and low efficiency. They prefer to use light arrows with tight bows, since the arrows fly straight without hesitation'.[43]

Arrow shafts

The shafts of all arrows excavated in Scythian burials were made of wood. Various species were used, including poplar, aspen, hornbeam, linden, maple but birch was the commonest. The shafts have round or oval cross-sections and were pointed at one end in order to be accommodated within the arrowhead socket. They vary in length and where fully preserved, vary from 30–52 cm. At the same time, for example, in the quiver from burial 2 near Bulgakovo village, there were arrows of different lengths: 28 arrows were 42–44 cm long with a shaft thickness of 4 x 3 mm, and three arrows were 52–53 cm long with a shaft thickness of 5 x 4 mm.

Arrow shaft decoration

Scythian arrows were marked: it could be assumed that all were coloured but this is not certain and in all the preserved cases, the arrow shafts were painted with red paint. The shafts of some were painted with different red, black, yellow and blue designs (Figure 17).

Fletching

Traces of this are rarely preserved and for example were only present on a single arrow from a set of fully preserved arrows found in a quiver in a kurgan situated near Bulgakovo village (Figure 18). Traces of fletching were found on some arrows from Vodoslavka but the arrows were rarely preserved to their original length.

The study of the entire number of Scythian burials from the northern Pontic region, as well as the author's investigation of more than 300 quiver sets, allow us to refute the myth, often repeated in publications, that Scythians used cane arrow shafts with wooden connectors. This is incorrect. The shafts were exclusively wood and made as single shafts. The socketed ends were subjected to special treatment by being whittled to a cone. The thickness of the shafts in this place depended on the diameter of the sockets of arrowheads. There are also all-wood arrow shafts. Scythians living in the northern Pontic region in the 5th–4th centuries BC did not use any other arrows.

The ratio of the length of arrows with respect to the bow reflects the ratio of the length of the tension to the length of the bow: one had to exert considerable force to stretch the bowstring on it: the short Scythian bow was characterised by increased power.

Arrowheads

Arrowheads in the 4th century BC were cast from bronze and all of these were socketed. Iron socketed arrowheads are found but are much less common; bone socketed arrowheads and all-wood arrows were also used. Bronze arrowheads of the 4th century BC are divided into three-lobed and trihedral shapes. Their lengths range from 1.5–3.5 cm and their weight varies from 1.5–3.5 g, with an average weight of about 2.5 g. There are also larger arrowheads, mostly from elite burials. There are many variations in the types of these trilobate and trihedral arrowheads during this period but it is difficult to see what lies behind this. At the same time, work begun on the systematic classification of arrowheads shows that arrows of certain types dominated at particular periods: for instance, during the middle and second half of the 4th century BC the dominant type was a

[42] Daragan 2016a.
[43] *Cf.* Ruev 2011: 113.

Figure 17. Painted arrows: 1–2, from kurgan 8, burial 1 at Vodoslavka village; 3–10, from kurgan 5, burial 2 at Bulgakovo village (drawing by O. Ye. Buravchuk)

Figure 18. The preserved binding, probably on the place of fletching, on an arrow from burial 2 in kurgan 5 at Bulgakovo village (photograph: author)

trihedral arrowhead with a U-shaped notch (Figures 5.9–16, 12.1–24, 13.11–25, 16.2–13, 20–21). In addition to significant typological variety, there is also the interesting feature that many arrowheads were marked with symbols such as crosses, lines and angles in various combinations: since these were mostly cast rather than secondarily engraved, it is considered that these were makers' rather than owners' marks (Figures 5.1–8, 12.1–10, 13.6, 10, 13, 20–21, 16.14–19).[44]

Thus, arrows with three-lobed and trihedral arrowheads of approximately equal weight were used for Scythian bow in the 4th century BC. These were very light arrows as the total weight of the arrow with its metal head was only 6 to 10 g. Irrespective of arrow type, a single weight standard was maintained. The existence of this leads to the conclusion that there were special workshops and we can observe the presence of arrowheads cast in the same mould or pattern of a single mould in quiver sets found in burials at considerable distances from one other.[45] This suggestion is also supported by finds of arrowheads with the same symbols.[46] The technology of the production of arrowheads was most likely through lost-wax casting and here we must refute another regularly re-animated myth that the cavities often found on sockets or lobes of arrowheads were containers for poison: this is incorrect as all appear to be foundry spoilage.[47]

[44] Alekseev 2000*c*.
[45] Daragan 2017*a*: 81–82.
[46] Alekseev 1984: 73.
[47] Minasyan 2014: 88.

Figure 19. Scythian bronze arrowheads embedded in human bone (photographs: author)

Combat qualities of the Scythian bow

A bow equipped with ultra-light arrowheads was effective. The effectiveness of bow design can only be assessed by its ability to shoot. Numerous finds of arrowheads embedded in bones and soft tissue of both humans and animals illustrate the killing power of the bow (Figure 19). It is significant that despite the presence of other weapons at the Scythians, namely swords, axes, spears and darts, the bow was the main weapon. The study of bones and injuries shows that 90% of all weapon-induced trauma were made with arrows.[48] The popularity of the bow is confirmed by the large number of arrows in Scythian burials.

Quivers

Excavated Scythian quivers contained between 10 and over 200 arrowheads and as many as 16 quivers are attested from a single burial. There were often no more than 10–20 arrows in quivers placed in the burials of ordinary Scythians but in the burials of the Scythian elite there could be more than 100 arrowheads in a quiver. It is impossible to provide accurate statistics on arrowheads because the vast majority of Scythian burials were looted.

The need for arrows was huge and arrowheads had to be constantly produced, hence it is all the more remarkable that society could afford to take large quanties of high-tech bronze products out of circulation. Against the background of burials with gold this, of course, may seem insignificant

[48] Daragan 2016*b*.

Two quivers (A, B) in a burial (second quarter of the 5th-third quarter of the 4th century BC)	
Brilevka, Kurgan 22, Burial 2	A: 69 arrows B: 119 arrows
Brilevka, Kurgan 26, Burial 2	A: 67 arrows B: 76 arrows
Brilevka, Kurgan 9, Burial 1,	A: 40 arrows B: 35 arrows
Tyahynka, Kurgan 8, Burial 3	A: 11 arrows B: 45 arrows
Chkalovo, Kurgan 5, Burial 2	A:47 arrows B: 45 arrows
Prishib, Kurgan 6, Burial 1.	A: 35 arrows B: 32 arrows
Zlatopol', Kurgan 3, Burial 2	A: 105 arrows B: 107 arrows
Cherednykova Mogila, Kurgan	A: 115 arrows B: 48 arrows
Shachta 22, Kurgan 22, Burial 2	A:279 arrows B: 235 arrows
Orlyk	A: 164 arrows B: 141 arrows
Novoye Zaporozhye, Kurgan 7, Burial 1	A: 234 arrows B: 103 arrows
Novoye, Kurgan 6, п.1	A: 134 arrows B: 15 arrows
Pervomayevka, Kurgan 4, Burial 8	A: 106 arrows B: 108 arrows
Ilyinka, Kurgan 4, Burial 3	A: 71 arrows B: 83 arrows
Dudchany , Kurgan 3, Burial 1	A: 38 arrows B: 47 arrows
Erkovcy, Burial 2	A: 97 arrows B: 29 arrows
L'vovo, Kurgan 18, Burial 2	A: 52 arrows B: 84 arrows
Zolotaya Balka, Kurgan 13, Burial 7	A: 21 arrows B: 33 arrows
Orekhovo, Kurgan 3, Burial 2, скелет 1	A: 94 arrows B: 34 arrows

Three (A, B, C) and more quivers in the burial (end of the 5th-third quarter of the 4th centuries BC)	
Bliznets-2	A: 166 arrows B: 121 arrows C: 39 arrows
Zelyonoye Kurgan 2, Burial 3, chamber 1	A: 110 arrows B: 186 arrows C: 186 arrows
Korneyevka Kurgan 2 Burial 2	A: 186 arrows B: 181 arrows C:206 arrows
Arkhangelskaya Sloboda, Kurgan 5 Burial 1	A: 143 arrows B: 190 arrows C: 113 arrows
Malaya Lepetiha Kurgan 10, Burial 4	A: 35 arrows B: 83 arrows C: 105 arrows
V.Rogachik, Kurgan 9, Burial 2	A: 30 arrows B: 96 arrows C: 14 arrows
Vyvodovo, Kurgan 92, Burial 2	A: 69 arrows B: 111 arrows C: 44 arrows
Bol'shoj Ryzhanovskij kurgan	A: 94 arrows B: 84 arrows C: 86 arrows
Tolstaya Mohyla, Central tomb	A: 23 arrows; B: 70 arrows; C: 111 arrows; D: 36 arrows
Mamai-Gora, Kurgan 4, Burial 4	5 quivers: 320 arrows
Soboleva Mohyla, Burial 2	6 quivers: 237 arrows (46; 64; 37; 36; 21; 32)
Ilyinka, Kurgan 4, Burial 2	9 quivers: 659 arrows (52; 46; 64; 89; 204; 85; 44; 49; 25)
Kurgan Chertomlyk	10+ quivers
Berdyansky kurgan	11 quivers: 1394 arrows
Five Brothers', Kurgan 8	16 quivers: 1056 arrows

Table 1. Numbers of quivers and arrows in burials

but proves that the Scythians had a constant and operative ability to replenish their arrowheads and arrows. They had well-established supplies and production centres for casting arrowheads. This is perhaps supported by their withdrawal from the use of armour, the manufacture of which was highly laborious.[49]

It is worth paying attention to the following fact. The tradition of placing several quivers with a single individual first appears to have begun in this region towards the end of the 5th century BC as burials dating to the second half of the 6th to the first half of the 5th century BC contain no more than two quiver sets, although these are often very large and contain more than 200 arrowheads (see Table 1).[50]

The number of quivers in a burial reflects certain aspects of the burial rite as well as peculiar tactics of the Scythian battle, and for understanding this one can draw a possible parallel with a later description of Mongol tactics given by the Franciscan friar, Giovanni di Plano Carpini, who was entrusted by Pope Innocent IV to find out more about the Mongols by travelling as an ambassador to the court of Guyuk, the Great Khan, in 1245/47:

> 'Everyone must have at least these weapons: two or three bows or at least one good one, and three large quivers filled with arrows, a battle-axe and ropes for dragging machines. The rich, however, have swords which are sharp at the tip and honed on only one edge and somewhat curved ... Some Tartars, as we have said above, have iron armour ... The length of Tartar arrows is two feet and one palm and two fingers, and because feet vary we

[49] Minzhulin 1991.
[50] Daragan 2017*a*.

> give a geometrical measure of the foot: two grains of barley make an inch and sixteen inches make a geometrical foot. Their arrowheads are very sharp and are honed on both sides like a two-edged sword. These arrowheads have a very sharp haft a finger long which they embed in the shaft ... They have other arrows for shooting birds and animals and unarmored men and different kinds of arrows for shooting birds and animals ... You should know that when the Tartars see the enemy they advance and everyone shoots three or four arrows, and if they see that they cannot overwhelm the enemy they go back to their comrades. And this is a trick, so that their adversaries follow them to a place where the Tartars have prepared an ambush. If their enemies follow them to this trap, the Tartars circle around them and wound and kill them'.[51]

Carpini wrote about the arms and shooting tactics of the Mongols: 'You should know that if they can do otherwise they prefer not to fight hand to hand, but they injure and kill men and horses with arrows, and when the men and horses have been hurt by arrows, then they fall upon them'.[52] All men were armed with bows, as were many women, teenagers and even children, and it should be noted that full quivers are often found with burials of children from at least 10 years age. This is confirmed by the above-mentioned burial from Vladimirovka. Here again a parallel with the Mongols may be drawn as, according to Carpini's account, they taught their children archery from the age of two or three, gradually increasing the size of the bow as they grew and in this way strengthened the muscles of their arms and practised the art of shooting at the level of conditioned reflex.[53]

The presence of arrows with female Scythian burials has given birth to a very widespread myth about the Amazons. However, this is an unfounded interpretation of Scythian female burials with weapons. The analysis of the social stratification of the burial grounds of the ordinary Scythian population demonstrated that 'female burials with weapons among the Scythians, contrary to the opinion of some researchers, do not constitute a special social or property group.[54] All of these womens' burials with weapons are dated to the end of the 5th and 4th centuries BC and, in general, such burials vividly demonstrate the high level of militarisation of Scythian society. Female burials with weapons are always included in the Scythian ancestral burial ground and never form separate burial grounds, thus clearly were not part of a separate female dominated society.

Conclusion

The generalised data indicate that the Scythian archers of the northern Pontic region of the 4th century BC had bows of a size up to 76–78 cm across the curves. The length of the arrows ranged from 30 to 52 cm and the arrowheads weighed from 1.5 to 4.0 g. The average weight of the fully equipped Scythian arrow ranged from 6.0 to 10 g. To this we add that the average height of the Scythians did not exceed 1.60–1.70 m. Since the Scythians were horse archers, it is necessary to say a few words about their horses since this is likely to be related to reconstruction tactics of the Scythian battle. This is the more topical because we can assume that a horse archer was buried with his own horse in the entrance pit in burial 4 of kurgan 8 near Vodoslavka village.

Scythian archers mainly rode stunted horses with a withers height of 123–136 cm, much less often medium-sized horses with a withers height of 136–144 cm.[55] Scythian horses were much smaller than their modern equivalents and correspond to modern ponies. Contemporary depictions of Scythians riding stunted horses, as depicted for instance on plaques from Kul-Oba,[56] on the coin of Athei and the frieze of the silver amphora from Chertomlyk, with their feet almost touching the ground was correct. Riders on medium-growth horses are shown on the crest and cup from the Solokha kurgan.[57] Tall Scythian horses having height at the withers of 145–150 cm, were rare and were owned by the Scythian kings.[58]

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[51] Carpini, *The Story of the Mongols* 72–75.
[52] Carpini, *The Story of the Mongols* 76.
[53] Carpini, *The Story of the Mongols* 54; Nefedov 2008: 489.
[54] Bunyatyan 1985: 70.
[55] Tsalkin 1960: 186.
[56] Piotrovsky, Galanina and Grach 1986: fig. 202.
[57] Alekseev 2012: 150–55.
[58] Sekerskaya 1992: 188–90.

Fabergé and the gold making tradition in Russia

Caroline de Guitaut, LVO[1]

Abstract

This paper was originally delivered as a public lecture during the BP exhibition *Scythians: warriors of ancient Siberia* at the British Museum. It considers the impact of the remarkable archaeological discoveries on 19th century Russian goldsmiths with specific reference to the copies made by the Fabergé firm in 1882 of gold treasures excavated at Kerch. Fabergé's craftsmanship is examined in the context of contemporary Russian goldsmiths and the rise in popularity of antique inspired jewellery in western Europe.

Keywords: Russian; Scythian; goldsmith; jeweller; Fabergé; historicist; 19th century

This paper considers the relationship between a Russian goldsmith and jeweller working during the *Belle Époque*, best known for producing a series of elaborate gold and jewelled Easter Eggs, for the last two Emperors of Russia and the 3rd century BC gold treasures included in the BP exhibition *Scythians: warriors of ancient Siberia*. Through examination of the gold making tradition in Russia in the 19th century and by analysing the formation of an internationally renowned firm and its contemporaries, the root of this relationship will emerge. The jeweller in question was Carl Fabergé (1846–1920) and examples of his work, mainly drawn from the Royal Collection's remarkable holdings, together with pieces made by some of the most important 19th century Russian goldsmiths will be referenced.

Scythian gold ornaments, whether practical or purely decorative, were of remarkable sophistication, a testament to the exceptional skills of the craftsmen who made them. Given the nomadic lifestyle of these tribespeople they are also technically advanced, particularly in view of the rudimentary tools with which they worked. The earliest archaeological discoveries to reveal these Scythian treasures caused extraordinary interest in Russia not least from the Tsar, Peter the Great, but also from academics and experts charged with the process of recovering them from burial sites. Excavations near Kerch in 1830 under the direction of Paul Du Brux[2] and Ivan Stempkovsky, the governor of Kerch, revealed a large tomb believed to have belonged to a Scythian king and queen which contained numerous gold objects. These were placed in the Imperial Hermitage and formed the beginning of the archaeological collection which was displayed to the public once the Hermitage Museum had opened in 1852. Later excavations from the 1850s onwards resulted in further pieces being added to the collection and interest in the antiquities prompted the Fabergé firm to produce finely made, faithful copies of certain of the treasures together with other *objets d'art* inspired by them.[3]

The copies made by Carl Fabergé and his craftsmen, in particular the goldsmith Erik August Kollin (1836–1901), Fabergé's first head workmaster,[4] were exhibited at the Pan-Russian Exhibition in Moscow in 1882. Contemporary accounts of the exhibition record that the reproductions were highly regarded and were recognised as works of art because they were distinct from the more mass-produced jewellery submitted by other exhibitors. The Russian journal *Niva* dedicated an article to Fabergé's reproductions, explaining how they were copies directly taken from the treasure, by that time on display in the Hermitage. The article further explains how Fabergé's work marked a new era in jewellery making in Russia and details how seven masters worked for 120 days to make one necklace alone. This labour-intensive production was reflected in the prices of the pieces: a necklace cost 3,100 roubles and a pair of earrings 400 roubles. The author expressed the hope that in the future, thanks to Fabergé, the value of Russian jewellery would be measured not simply by the cost of the precious stones used but by their artistic form as well.[5] It was common for Russian jewellery at the time to feature huge precious stones in simplistic mounts which by Western standards were considered unimaginative and even vulgar.

In spite of the success with which Fabergé's Kerch copies were met, they were nonetheless challenging

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[2] A French antiquarian and the chief customs officer in Kerch.

[3] Some Fabergé copies of Scythian treasures were illustrated in *Niva* 40 (1882) following their display at the Pan-Russian Industrial Exhibition in Moscow that year.

[4] The position of head workmaster was responsible for overseeing technical production at the firm.

[5] *Niva* 40 (1882): 952–54t.

for his craftsmen to replicate because many of the ancient prototypes were characterised by technical execution involving skills which had been lost over the intervening centuries. Fabergé had to increase the number of goldsmiths he employed in order to complete the work and also to aid the reintroduction of various of the ancient techniques. The resulting display at the Pan-Russian exhibition attracted huge attention, notably from the Emperor, Alexander III (1845–1894), who declared his admiration for the pieces, and his consort, Maria Feodorovna (1847–1928), who purchased a pair of cuff links in the form of crickets, or cicadas, which according to ancient belief would bring good luck. Fabergé was awarded a Gold Medal and the public and imperial recognition of his jewellery marked a major turning point in the firm's history. Three years later, on 1 May 1885 Carl Fabergé was granted the official title of Supplier to the Imperial Court.

To understand why Fabergé was prompted to make copies of the Scythian treasures it is essential to understand the history of the establishment of the Fabergé firm. Gustav Fabergé (1814–1893) was the first member of the family[6] to become a goldsmith, apprenticed to Andreas Spiegel and Johann Keibel in St Petersburg he became a Master goldsmith in 1841. The following year he opened his own shop in Bolshaya Morskaya, just off Nevsky Prospekt and close to the Winter Palace, in which he sold his well made but unremarkable jewellery and gold and silver objects. In 1846 Gustav's son Peter Carl Gustavovich Fabergé was born and when Carl Fabergé was 14 years old, Gustav decided to move his family to Dresden, leaving the business in the hands of friends. It was here that Carl undertook his apprenticeship as a goldsmith in Dresden and also in Frankfurt. While in Continental Europe he also had the opportunity of visiting and studying in Paris, Florence and Rome. In 1864 Carl Fabergé returned to St. Petersburg and entered the family firm, taking over the business in 1872 and with his ingenuity, business acumen and technical skill, together with the unsurpassed quality of the works produced by his craftsmen and designers,[7] he transformed the business into an international enterprise, becoming one of the foremost jewellers and goldsmiths of the late 19th and early 20th centuries.

Documents in the Russian State Historical Archives including letters from A. Vasilchikov, the Director of the Imperial Hermitage, confirm that Carl Fabergé spent 15 years, from 1867, working in the museum, voluntarily repairing antiquities, gold and silverware and appraising the value and quality of precious stones. The documentation confirms that it was during this time he became well acquainted with the recently discovered Scythian treasures.[8] The Curator of Antiquities at the Hermitage, Mr Stefani, in a letter of support for Fabergé's appointment as Supplier to the Imperial Court states 'Mr Faberge has since permanently participated in all technical and at times quite laborious researches relating to numerous objects of the Hermitage archaeological collections. Thanks to his conscientious work, he could always accurately determine the quality of old materials of which many of the Hermitage objects were made, and by doing this he significantly assisted their proper cataloguing. When we received findings from the annual diggings of the Imperial Hermitage Archaeological Commission, Fabergé, as a scholar and learned jeweller always helped me in reassembling an ever historically true item out of a multitude of broken fragments'.[9] Fabergé's involvement thus included detailed examination of the antiquities and also, perhaps more significantly, their repair, providing him with a unique understanding of their manufacture. He was clearly committed to his role at the Hermitage but was not offered, nor did he request, payment for his services. Ultimately, however his voluntary role at the museum assisted him in gaining the prized status of an official supplier to the Imperial Cabinet.

The copies of Scythian gold jewellery are amongst the earliest documented works by the Fabergé firm. The memoirs of Franz Birbaum, the firm's chief designer between 1893 and 1917, confirms the report in *Niva* that the execution of the jewels required considerable exactitude and the reintroduction of some long-forgotten techniques. This included granulation where grains of precious metal are added to the surface of a metal object, a technique first practised around 5,000 years ago.[10] Birbaum adds that the order for the copies was placed by Sergei Stroganov, President of the Imperial Archaeological Commission and founder of the Stroganov School in Moscow in 1825, the first private academy of art in Russia.

A bracelet which formed part of the group of Fabergé copies was evidently a popular model as several other versions made by different goldsmiths exist but despite their similarity these bracelets were apparently separately conceived. The American firm of Tiffany produced one in 1877/78, pre-dating that made by Fabergé; Tiffany's bracelet was based on originals from the Cypriot Curium Treasure at the Metropolitan Museum of Art in New York. Another version was made by the British firm of Phillips Brothers and Sons and dates from slightly later, and copies a Scythian example like Fabergé's (Figure 1).[11]

[6] The Fabergé family was of French Huguenot and German-Baltic origin and had settled in Livonia, Pernau (Pärnu, Estonia).

[7] Agathon Fabergé joined his brother as designer from 1882 to 1895 and a Swiss jeweller, Franz Petrovich Birbaum, joined the firm in 1893, becoming chief designer after Agathon's death in 1895.

[8] Habsburg-Lothringen and Lopato 1993: 54.

[9] Russian State Historical Archives f.472 op. 38 del. 7 pp. 41-44.

[10] Habsburg-Lothringen and Lopato 1993: 446.

[11] Gere and Rudoe 2010: 436.

Figure 1. Lion's Head Bracelet, Phillips Brothers and Sons, *c.* 1870–1880 (British Museum, inv. nr. 1978,1002.980, Hull Grundy Gift)

The late 19th century saw an increased interest in jewellery in the antique style, which became fashionable in response to major international archaeological discoveries. The inspiration for designs varied from country to country: the Egyptian revival was particularly prevalent in France, specifically in the work of the firm of Froment-Maurice, whereas the Assyrian revival was seen in the work of several jewellers in England and was particularly notable in the work of the most famous archaeological jewellers of the 19th century, the Castellani in Rome. It is possible that Carl Fabergé visited Castellani's studio in Rome where he would have seen the permanent display of antiquities shown alongside the firm's own modern gold jewellery in the antique taste and this almost certainly later inspired Fabergé to make copies of the Scythian treasure in Russia. Fabergé's early archaeological style does nonetheless owe a great deal to the technical ingenuity and innate sense of design of Erik August Kollin. Kollin had completed his apprenticeship in his native Finland before moving to St. Petersburg to find work, where in 1858 he obtained a position in the workshop of the goldsmith August Holmström, principal jeweller at the firm. In 1870 Kollin opened an independent workshop directly supplying gold objects and jewellery to the Fabergé firm. The copies of the Scythian treasures and numerous other pieces made by Kollin show his affinity for the texture and colour of gold and its infinite technical and aesthetic possibilities when applied to a wide range of objects. This is borne out by specific examples in the Royal Collection which show a consistency of style, continually making reference to the antique in elements of their design and technical execution, something which Franz

Figure 2. Match Holder, Fabergé, St. Petersburg, before 1896, Royal Collection (RCIN 8337) (Royal Collection Trust / © Her Majesty Queen Elizabeth II 2018)

Birbaum made reference to in his memoirs.[12] A gold, ribbed heart-shaped box (RCIN 38211) dated from before 1896 is mounted with a turquoise engraved with an Arabic inscription demonstrating the fashion for stones repurposed into antique-style settings. A box (RCIN 22961) features the matt surface and dark yellow gold with which Kollin replicated the worn surface patina of the Kerch antiquities, while combining with it the contemporary Russian fascination for the imitation of natural materials and textiles in gold and silverware, in this example a basket-weave design. A brick made in the Gusareva factory, Moscow, was repurposed by Kollin as a match holder. The thick gold wire of its handles terminating in zoomorphic snakes' heads set with cabochon stones, which are reminiscent of the coiled gold seen in a number of Scythian pieces, often with animals' heads forming the focal point of the designs (Figure 2).[13] Other examples of Kollin's gold-mounted objects such as a banded agate cup (RCIN 23090) and a bloodstone kovsh (RCIN 23103) replicate the texture and patination of antique gold; a desk seal (RCIN 13955) with a smoky quartz matrix is directly inspired by antique prototypes, its matt gold

[12] In describing Kollin's gold objects inspired by the antique, Birbaum states that 'settings were made of high quality matt gold in the form of hoops of fine beads or laces, interlaced with carved or filigree ornamentation' (Habsburg-Lothringen and Lopato 1993: 447).

[13] See Simpson and Pankova eds 2017: 62 cat. no. 21.

Figure 3. *The Great Exhibition: Russia*: Joseph Nash (1809–1878) 1851, pencil, watercolour and bodycolour, Royal Collection (RCIN 919954) (source: Royal Collection Trust)

chased handle copying the form of ancient examples, types of which the goldsmiths must have been aware of, such as a bow case attachment of the 5th century BC.[14] These examples show that Fabergé made objects which were part of a fashionable resurgence of interest in the antique which was seen throughout western Europe and in north America. However, it is important to remember that his work did not conform to one style and it must be viewed in the context of the broader inherent gold-making tradition in Russia.

In general terms it should be acknowledged that Russia was always on the fringes of artistic development in Europe and as a result Russian gold and silver of the 18th and early 19th centuries, like its porcelain and glass, was derivative of western European prototypes but generally inferior in quality. By the mid-19th century, however, the Russian revival style began to gain recognition, receiving praise at the international exhibitions which became such an important stage on which the work of Russian goldsmiths was seen alongside western European and American counterparts. The role of the international exhibitions, which began with the first and, arguably, most important of such events, the 1851 Great Exhibition of the Works of Industry of All Nations in London was therefore of great significance in the development of a recognisable Russian style exemplified in typically Russian products (Figure 3).

The vast scale of the 1851 Great Exhibition staged in Joseph Paxton's Crystal Palace and organised by Henry Cole with the direction of Prince Albert, was never to be repeated and subsequent world fairs tended to focus more on art manufacture. Subsequent world fairs included the London exhibition of 1862, the fairs held in Paris in 1867, 1876, 1878, 1889 and 1900 and also those in Vienna and Philadelphia in 1873 and 1876 respectively. However, participation at these fairs by Russian goldsmiths dramatically changed perceptions of Russian metalwork which began to assert a home-grown aesthetic. Western styles were never completely discarded by Russian makers and by the early years of the 20th century Russian and western European designs were successfully combined into a true *stil modern* that in itself became entirely unique to Russia, seen in the work of many firms, including Fabergé.

The great irony of native Russian metalwork production is that throughout the imperial period the craftsmen in the workshops of Russian silversmiths and goldsmiths, especially in the new capital city St. Petersburg, were foreigners usually from either Germany or Scandinavia. In Moscow, however, many more were native Russians,

[14] Possible bow-case attachment, British Museum 1897,1231.39 (Simpson and Pankova eds 2017: 317).

who tended to retain traditional designs and techniques which were in demand from the local clientele. This trend continued in the 19th century and is demonstrated by the origin of many of Fabergé's craftsmen and those of other contemporary goldsmiths. Ironic though this state of affairs was, it did demonstrate that craftsman were drawn to work in the major cities of Russia, indicating the demand for fine quality and therefore expensive products, driven partly by imperial patronage but also by the increasing wealth of the merchant classes.

Figure 4. Punch Set, Sergei Verkhovtsev and Imperial Glass Factory, St. Petersburg, 1874, Royal Collection (RCIN 104208.a-k (source: Royal Collection Trust) (Royal Collection Trust / © Her Majesty Queen Elizabeth II 2018)

There were various important firms preceding Fabergé which achieved both national and international recognition and success. The firm of Sazikov, for example was founded in Moscow by Pavel Sazikov in 1810 and a second branch was opened in St. Petersburg, in 1842, by Pavel's son Ignatii who had taken over the firm. One of the best-known silversmiths in Russia and one of the first to use mechanical equipment, it also pioneered the division of labour within its production, separating workers by task to improve efficiency. In 1844 the firm received the Imperial warrant becoming an official supplier to the Imperial Cabinet. It was a mark of the firm's importance that it was selected to send work to the Great Exhibition in which 29 objects were exhibited, mostly in the Russian style including bratini and cups. The work of the firm was well-reviewed and the Broadsheet of Russian Art recorded that 'until now, all silver works made in Russia imitated foreign models; in the works of Mr Sazikov the ideas, drawings, models and their execution arise from the intellect and labour of the Russian'.[15] One of the most notable pieces displayed was a large sculptural group in the form of a table centrepiece in silver, almost certainly inspired by a magnificent table service for 50 people, including seven sculptural groups, which Emperor Nicholas I had commissioned from the firm of R&S Garrard during his visit to Britain to see Queen Victoria in 1844. The firm went on to exhibit at the Paris exhibition of 1867 to which they sent a large group of objects decorated with finely worked eastern motifs. These included a punch bowl and ladle with cups on a tray, which became a staple production, not just for Sazikov but for other goldsmiths and was particularly popular as a presentation gift given in the name of the Emperor. One such example in the Royal Collection was given to the Prince of Wales (later King Edward VII) by Emperor Alexander II at the time of the marriage of his daughter Marie Alexandrovna (1853–1920) to the Prince of Wales' younger brother Alfred Duke of Edinburgh (1844–1900) in 1874 (Figure 4). It was made by the firm of Verhovtsev, which had participated in the 1862 London exhibition and was subsequently made a purveyor to the imperial court in 1871. The jug, glasses and tray are decorated in the Russian revival style, the coloured motifs inspired by the publication of Victor Butovski's *Histoire de L'Ornement Russe du Xe au XVIe Siecle d'apres les Manuscrits*, published in 1870 which with its illustrations of hundreds of medieval ornamental motifs encouraged Russian goldsmiths and jewellers to replicate such motifs in their metalwork and enamel.[16]

Some of the Moscow gold and silversmiths of the late 19th century were able to attract leading designers and sculptors to provide new models and ideas due to the slightly cheaper cost of labour in the city of Moscow and the high demand for wares from the wealthy merchant classes who lived there. Not only did these firms participate in the international exhibitions, but they sent representatives to record the latest creative ideas and techniques and often brought back examples to Russia for study.

Such rival firms included Sazikov's most significant competitor Pavel Ovchinnikov whose firm was founded in 1853. Ovchinnikov also founded a school to study the techniques of the goldsmith and enameller which offered 130 apprentices training over a five or six-year period. Ovchinnikov received the Imperial warrant in 1865 and became a prolific supplier to the imperial

[15] Odom 2011: 151.

[16] Victor Butovski was Director of the Stroganov Institute; his 1870 publication was based on Old Russian manuscripts which formed the basis of study at the Institute but it also included wall paintings and architectural details from churches.

family, necessitating the opening of a retail store and workshop in St. Petersburg in 1873. On the world stage Ovchinnikov received great recognition in Vienna at the International Exhibition of 1873 where he was awarded the title of Purveyor Ordinary to King Victor Emannuele of Italy. In Philadelphia in 1876 and at the All-Russian exhibition in Moscow of 1882 Ovchinnikov was widely praised for the quality of his exhibits and was awarded with a silver medal.

The products produced by the firm ranged from enamelled silver decorative wares to plate and sculpture. It pioneered the Russian Revival style, being largely responsible for introducing the filigree and *pliqué a jour* techniques of enamelling to the Moscow silver trade, examples of which entered the Royal Collection as gifts from the Russian imperial relations but also as direct purchases made by Queen Alexandra.[17] After Pavel's death in 1888 the firm was continued by his sons until it was eventually dissolved in 1917.

The firm of Khlebnikov was established by Ivan Khlebnikov with a workshop in St. Petersburg in 1867, and another workshop opened two years later in Moscow. Objects made by the firm were shown at the Vienna International Exhibition and in 1879 Khlebnikov received the Imperial warrant. Ivan's sons acquired the shops and workshops of Sazikov in 1887 and went on to become Ovchinnikov's principal competitor. In addition to producing dozens of tea and coffee services which were popular with their clients, both firms were responsible for major large-scale commissions: in 1882 Ovchinnikov restored the iconostasis in the Dormition Cathedral in the Kremlin for the coronation of Alexander III and in 1895 Khlebnikov made a gilt-bronze framework for the iconostasis of the Annunciation Cathedral of the Kremlin. By 1882 Khlebnikov employed 200 workers and also maintained two schools, one for instruction in drawing and the other for sculpting.

The family firm of Keibel in St. Petersburg was established in 1791 by Otto Samuel Keibel, a native of Pomerania. After his death his son Johann headed the firm which specialised in gold boxes, many produced as presentation pieces for Nicholas I's coronation in 1825. Among those who trained under Johann Keibel was Gustav Fabergé, father of Peter Carl. Following Johann's death the firm continued to operate until 1910 and specialised in the production of insignia serving the Imperial court. These firms constituted what was in effect the golden age of metalwork in Russia. While many of the master goldsmiths had trained abroad, the role played by the establishment of the technical schools in both St. Petersburg and Moscow, several of them annexed to the goldsmiths, was important in fostering home-grown skill. Baron Sergei Stroganov founded the Stroganov Institute in Moscow in 1825 to provide training in the decorative and applied arts; renamed in 1860 as the Stroganov Institute for Technical Drawing it created a training ground for some of the finest craftsmen and designers of Russian silver and jewellery. In St. Petersburg, the Baron Steiglitz Museum – named after its founder Baron Alexander Steiglitz – was an institution which prepared skilled draftsmen and artist designers to allow participation in the international exhibitions.[18]

In addition to the goldsmiths already mentioned, there were many other smaller Russian makers who were both prolific and also had an international profile including the Grachev Brothers, and the firms of Kurliukov, Kuzmichev, Marshak, Semenov and Postnikov. However, by the late 1880s the firm which surpassed all other goldsmiths in Russia was the firm of Fabergé. Describing himself as a jeweller-goldsmith, Carl Fabergé could easily demonstrate his prowess in both fields although the House of Bolin outstripped Fabergé as a supplier of fine jewellery to the imperial court.

Bolin became court jeweller to Nicholas I in 1839, although the firm's history can be traced back to the last decade of Catherine the Great's reign in the 1790s and subsequently it supplied the majority of jewels to the Swedish and Russian courts until the Russian Revolution in 1917. The Vladimir Tiara, attributed to Bolin, owned by Queen Elizabeth II, was originally made in around 1874 for the Grand Duchess Maria Pavlovna (1854–1920), wife of Grand Duke Vladimir (1847–1909) and sister-in-law of Emperor Alexander III. It was sold to Queen Mary by the grand duchesses' daughter Princess Nicholas of Greece (1882–1957) in 1921 and is today regularly worn by The Queen to whom it was bequeathed in 1953. The second generation of the Bolin family of jewellers to settle in Russia came from Sweden, a reminder that Fabergé was competing on an increasingly international stage. Competition came not purely from Russian and its closer neighbours but also from further afield and included the French firms of Boucheron and Cartier who had established themselves in Russia in an attempt to emulate Fabergé's business success and copy his products. In the event their physical presence in Russia was relatively short-lived, but both firms received the patronage of the Russian imperial family.[19]

One of the contributing factors to the success of Carl Fabergé's business, however counter-intuitive, was the highly derivative style of many of the works he

[17] RA/VIC/ADDA21219/B.

[18] Kettering 2017: 21.

[19] In 1904–1905 Pierre Cartier travelled to Moscow and St. Petersburg on a selling trip and the firm subsequently outsourced work to various Russian makers. Boucheron founded a branch in Moscow in 1893, which closed in 1911.

produced. Looking back from the 21st century it is easy to be critical of the firms work in this respect and yet by taking inspiration from multiple sources and artistic traditions, Fabergé could truly appeal to the broadest possible client base. The pieces copied from the Kerch treasure were not the only antique-inspired works that the firm produced: a Greco-Roman-style amphora in its combination of stone and classical motif was produced in the workshop of Erik Kollin (Figure 5). Each subsequent head workmaster brought their own aesthetic to the firm. During the tenure of Mikhail Evamplievich Perkhin, who occupied the role between 1886 and 1903, the firm's favourite style became Louis XV and baroque. The inquisitive minds of Carl Fabergé and his collaborators sought inspiration in a myriad of styles from Empire, Neo-Gothic, Louis XVI and Renaissance to Arabic, Indian, Chinese and Japanese but this was always combined with the highest possible level of craftsmanship, the use of the finest quality materials and the ability to apply these criteria to a vast range of decorative and practical objects. The majority of these eclectic styles are represented in the Royal Collection of Fabergé, which is unique for two principal reasons: firstly because it contains one of the largest and most diverse range of works, which are of impeccable provenance and secondly because it was formed – unlike other major Fabergé collections in existence today – prior to the Russian Revolution, largely through the exchange of gifts between the Russian imperial family and the British royal family. It is representative of every type of object produced by the firm and therefore demonstrates each and every one of the diverse stylistic traditions demonstrated in Fabergé's work.

Figure 5. Amphora, Fabergé, St. Petersburg, before 1896, Royal Collection (RCIN 9112) (Royal Collection Trust / © Her Majesty Queen Elizabeth II 2018)

The Louis XV style was repeatedly seen, for example in a terrestrial globe, made in Kollin's workshop with baroque-inspired mounts emphasised by the different coloured gold alloys used in its construction (Figure 6). A miniature desk features not only the most elaborate Louis XV mounts but also the finest guilloché enamel enamelling which the firm excelled in producing. Based on an 18th century French technique where the surface metal is engraved with a pattern using a rose engine or *tour a guilloché*, the object is then enamelled in layers of translucent coloured molten glass which is fired at very high temperatures and, after hours of hand polishing, produces a transparent surface through which the engraved pattern is seen. In the late 19th century the neo-rococo style was prevalent in the Russian court, in both furnishing and decoration, and Fabergé responded to this by producing a number of works combining Russian hardstones – one of his signature materials – with elaborate gold mounts echoing the scrolls and foliate motifs of the original 18th century rococo style. The restraint of the Louis XVI style, characterised by economy of form and decoration, made an impact through the work of Fabergé's third and final head workmaster Henrik Wigström (1862–1923), a renowned Finnish craftsman and designer. Elements of Louis XVI design were applied to the most modern of products such as the cigarette case, demonstrating that the firm could adapt its style to the prevailing fashions when cigarette smoking overtook snuff-taking as the habit of choice in the late 19th century.

Competing on the international stage meant that Fabergé was not immune to design trends in other countries and this is evidenced by a pen rest of rhodonite with enamelled gold anthemion motifs, which exactly recalls the ornamentation illustrated in Owen Jones' influential book, *The Grammar of Ornament*, published in 1856, with which Fabergé and his designers were undoubtedly familiar. In the same stone, a faceted cup with red and yellow gold mounts was applied with a baroque pearl and a rich blue guilloché enamel cigarette case was embellished with a snake eating its tail set with hundreds of tiny rose diamonds, both overtly in the art nouveau style. These objects were both made in 1908 in a style with which Fabergé

Figure 6. Terrestrial Globe, Fabergé, St. Petersburg, before 1896, Royal Collection (RCIN 40484) (Royal Collection Trust / © Her Majesty Queen Elizabeth II 2018)

dabbled in a limited way. In 1900 his works displayed at the Universal Exhibition in Paris were lauded for their skill and ingenuity and as a result he was awarded with the Légion d'Honneur. However, Fabergé was also the subject of criticism due to his inability to embrace the art nouveau style which was then at the forefront of French design. Partly in response to this and partly to satisfy one of his most important imperial clients, Empress Alexandra Feodorovna (1872–1918), consort of Nicholas II Fabergé began to produce objects in the art nouveau taste. Alexandra's predilection for the style probably stemmed from her knowledge of the *stil modern* or *Jugendstil*, which was practised by artists who lived and worked in a colony established in Darmstadt by her brother, the Grand Duke of Hesse, in 1899.

It is clear with the dual resources of talented designers and remarkable craftsman, Fabergé was able to emulate historic styles and embrace new ones, but another of the keys to his success was the organisation of his business. In 1898 Carl Fabergé moved the firm to new premises in St. Petersburg at 24 Bolshaya Morskaya. Here he could accommodate a large ground floor retail space, his own apartment for himself and his family and numerous of his specialist workshops all situated in one site, while others of his master craftsmen retained their own premises nearby. The scale and labour-intensive production reminds us that the guild system was still firmly in force in Russia with apprentices working alongside more skilled craftsmen and virtually every task being carried out by hand with very little machine production. Fabergé employed various designers including his own brother Agathon, Franz Birbaum and even a female designer Alma Pihl who designed two of the famous Imperial Easter eggs.[20]

In 1887 a branch of the firm was opened in Moscow with both retail space and a workshop. One of the key craftsmen and designers supplying the Moscow branch was Feodor Rückert (b. 1851), who produced works of exceptional contemporary design reflecting the strong neo-Russian style which was particularly well received in Moscow.[21] Rückert's enamelling was among the most exquisite produced by the firm, combining a subtlety of colour palette and sophisticated abstraction of motif in his cloisonné enamelling in a truly modern Russian style. Fabergé went on to open a branch in Odessa in 1900 and in 1903 established an outpost in London at Berners' Hotel, the only branch of the firm not on Russian soil. The branch later moved to Duke Street in 1904 and to 48 Dover Street in 1906 before settling at 173 New Bond Street in 1911 and finally closing in 1915 by order of Imperial decree that no Russian businesses could operate outside the national boundaries. The London branch became the most profitable outlet of the firm and stocked a vast range of merchandise specially selected by the branch manager, Henry Charles Bainbridge. In addition to the local clientele, the branch undertook to supply clients all over continental Europe and as far afield as Thailand, but the key to its success was the patronage of the British royal family and principally from Edward VII and his consort Queen Alexandra, sister of the Russian Empress Marie Fedorovona. Vast quantities of works were purchased by the royal family both for themselves and as gifts to be given away to family and friends and their patronage naturally brought with it not only other European royalty but a host of loyal and wealthy Edwardian customers. A number of direct commissions were also placed through the firm by the royal family, including one from George V and Queen Mary for a cameo portrait of their son[22] on the occasion of his investiture as Prince of Wales in 1911. The original record of the design by

[20] Alma Pihl (1888–1976) designed both the Winter Egg (1913) and the Mosaic Egg (1914) (RCIN 9022).
[21] Rückert established his workshops in Moscow in 1886. His enamelling became sophisticated, both in colour palette and form, the silver-gilt wirework cloisons becoming a feature of the decoration in their own right.
[22] Later King Edward VIII.

Henrik Wigström miraculously survives in an album discovered in Finland in the late 1990s.[23]

In retrospect the name of Fabergé is mainly associated with the production of Easter Eggs for the imperial family which, in the aftermath of the revolution were all sold by the Antikvariat[24] in exchange for hard currency and are now in various collections around the world with the exception of the 10 Easter eggs which remained in Russia and which are now on display in the Kremlin Armoury. The three Imperial Easter Eggs in the Royal Collection were both acquired by King George V and Queen Mary in 1929 and 1933.[25]

Fabergé's painstaking copies of the Kerch Scythian treasures were of great significance both to his development as a goldsmith and as Russia's contribution to the fashion for archaeologically inspired jewellery in the late 19th century, which manifested itself in both Europe and America. These exquisite gold jewels can be seen as part of a broader historicist artistic movement prevalent in continental Europe. With his workmaster Erik Kollin, Fabergé could produce not only perfectly executed direct copies but could also form a whole design aesthetic seen in a number of works made in the earliest years of Carl Fabergé's tenure as head of the firm. The flowering of the gold making tradition in Russia in the 19th century was fundamentally aided by participation in the international exhibitions which allowed a new and wider audience to become familiar with the growing confidence of these native producers – a symbiotic relationship which gave designers and craftsmen the chance to learn from their European counterparts. Fabergé's international ambitions and business organisation together with his exacting standards contributed enormously to his success as did the incredible skill of his designers and makers – all carefully regulated by Fabergé's own exacting standards. But arguably the secret of his success was the Imperial patronage of the last two Emperors of Russia and the additional patronage this afforded him from their relatives in the British royal family which was to ensure his meteoric rise to success as a Russian goldsmith and jeweller.

[23] Tillander-Godenhielm ed. 2000: 79.
[24] A government bureau created by Lenin in 1921 with the purpose of selling Russian state treasure to the West.
[25] The Colonnade Egg (1910) was purchased in 1929 and the Basket of Flowers Egg (1901) and the Mosaic Egg (1914 in 1933.

Scythians, Persians, Greeks and horses: reflections on art, culture, power and empires in the light of frozen burials and other excavations

Henri-Paul Francfort[1]

Abstract

This paper presents an overview of Achaemenid and Greek artistic forms found in numerous archaeological excavations of both frozen and unfrozen burials of Scythian nomads from the Urals to China. The chronology of these finds show that steppe art is autochthonous and that loans of objects and motifs from the Persian empire, exemplified by the sites of Persepolis and Susa, began in the Altai at Tuekta and Pazyryk, but continued after the fall of the Achaemenids. Non-figural elements such as palmettes, and compositions such as the horned lion, chariot image and others, suggest that steppe artists selected some patterns but adapted them according to existing norms of the artistic style of indigenous and ancient steppe tradition. The use of the 'face and profile' combined with 'split representations' illustrates this transformation process. Comparisons show that transfers from Persian arts through central Asia and the steppe as far as China were surprisingly numerous yet the overwhelming majority of artistic motifs such as raptors or felines remained those of the steppe.

Keywords: Achaemenid art; Greek art; Scythian art; Altai; frozen burials; horse tack; 'split representation'; Pazyryk; Persepolis; Ak-Alakha

Introduction

Eurasia is an open world with an open system of communication, and the aim of this paper is to highlight the close relationships between Scythians (Saka), Persians and Greeks from Bactria to the Urals, Altai, the Kazakh steppe and China (Xinjiang, Gansu, Qinghai, Ningxia). This is hardly a new topic and many different studies have already covered this large and complex question. I shall therefore offer no more than an overview, acknowledging the pioneering studies by M. Gryaznov[2] and S.I. Rudenko,[3] catalogues of exhibitions held since the 1960s, and equally important studies published by K. Akishev, A. Alexeyev, L. Barkova, K. Chugunov, E. Korolkova, V. Kubarev, A. Lukpanova, V. Molodin, S. Pankova, N. Polosmak, T. Ryabkova, E. Stepanova and many others. It is impossible to reference them all. However, we may mention some of those in the English language, such as the works by G. Azarpay[4] and others,[5] and the contributors to the journal *Source* and published in 1991.[6] In French, the works by the late V. Schiltz[7] and I. Lebedynsky should also be highlighted.[8] In the past few decades, excavations carried out by national and international teams in China, Kazakhstan, Mongolia and Russia have revealed a great deal of new material, particularly concerning but not restricted to the early phases of contacts.[9] Since the spectacular mainly post-Second World War discoveries at Pazyryk in the Altai, there have been further finds of frozen burials on the Ukok plateau, at Berel' and in Mongolia, as well as artefacts and ecofacts excavated at Arzhan-2 in Tuva,[10] and sites in Xinjiang. These are now being studied in modern scientific laboratories and offer greater accuracy owing to the use of more modern techniques, especially for organic materials. On the basis of a new chronological framework based on radiocarbon and dendrochronological dates, a reappraisal and re-sequencing of these finds can now be proposed.[11]

The results enable a new focus on representations of Achaemenid appearance, while acknowledging that the great majority of finds belong to the world of steppe art (Figure 1). We begin with an examination of some artefacts bearing in mind that the old concept of the so-called 'Scythian triad' of horse equipment, weaponry and steppe art still defines much of what we understand of the Scythian world. If we follow the contemporary written and visual sources of the Persian period, the nomads who were considered to be 'barbarians' were either represented as vanquished enemies, as on the Bisitun relief of Darius I or the wooden comb from

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[2] Gryaznov 1950; 1969; 1984.

[3] Rudenko 1958; 1970.

[4] Azarpay 1959.

[5] Stark *et al.* eds 2012.

[6] Bunker 1991; Juliano 1991; Kawami 1991; Lerner 1991.

[7] Schiltz 1994.

[8] Lebedynsky 2001; 2003; 2006; 2010.

[9] Beisenov ed. 2015; Derevyanko and Molodin eds 2016; Molodin and Hansen eds 2011; Molodin and Epimakhov eds 2014.

[10] Chugunov, Parzinger and Nagler *et al.* 2010.

[11] Heussner and Slyusarenko 2007; Seifert and Slyusarenko 1996; Slyusarenko 2000; Zaitseva *et al.* 2005; Zaitseva and Bokovenko eds 2005; Zaitseva and Kulkova eds 2007.

Figure 1. Lotus flower roundels, and lions with geese in split representation: horn, Pazyryk 2 (after Rudenko 1970: fig. 159a–c: a, The State Hermitage Museum, St. Petersburg, inv. nr. 1684/353, b, 1684/358, c, 1684/361)

Taksai-1, [12] or as loyal vassals judging by the reliefs at Persepolis. However, the truth was different and, according to Greek sources, the Achaemenid armies incurred some defeats during battles with Scythians on the steppe.[13] This paper, with the help of selected examples, defines the position of Pazyryk culture and arts between the Achaemenid empire and its imperial capitals (including Persepolis), its eastern satrapies (such as Bactria), and China's northwest territories during the period of the 'Warring States' (such as Xinjiang, Gansu, Ningxia and inner Mongolia). The aim of this paper is to focus on the motifs rather than direct imports, which have been discussed elsewhere.

An Achaemenid presence on objects found as part of the Pazyryk culture is well-known, whether imported, imitated or adapted, and many scholars have studied this topic over the past decades. However, some new finds allow a better distinction between local borrowings and what was physically carried as far as China, both during and after the period of the Achaemenid empire from the 6th to 4th centuries BC. An important question for understanding this historical phenomenon is the chronology but which is now refined thanks to the use of dendrochronology and radiocarbon dating (Figure 2). Nevertheless, we must remember that some artefacts may have had a long life before they were deposited in burials, and that some may have been used and re-used over a long period. However, for instance, compared to the Tuekta 1 (*c.* 440–430 cal. BC) and Bashadar 2 kurgans, where Achaemenid influence is minimal, the Pazyryk 5 kurgan (*c.* 250 cal. BC) seems to be the most influenced by Achaemenid Persian arts. The Pazyryk 1 and Pazyryk 2 kurgans (*c.* 295–300 cal. BC) display a fair number of artefacts of Achaemenid appearance, as does the Berel'11 kurgan (ca 293–294 BC), and the Ak-Alakha 3 (kurgan 1) burial, which is even later as it dates to *c.* 274 BC. Regardless of whether these objects are related or not to the conquest of Asia by Alexander the Great and the spread of Achaemenid artefacts by Greeks, possibly through the migrations of Yuezhi/Ruzhi nomadic group up to China, discussed further below, this phenomenon certainly reflects the fact that the main period of Achaemenid influence in the Altai region and beyond occurred after the end of the Achaemenid empire with the death of Darius III in 330 BC. On the other hand, the mode of Greek influence is not easy to trace as it could have been direct, either before or after Alexander's conquest, or mediated through Achaemenid channels, and we shall return to this question below. In the meantime, we can summarise the history with the help of a chronological chart based on dendrochronological and radiocarbon analyses, and this allows the distinction of four main periods of interaction between the steppe world and the large empires of the ancient Near East.

The 8th–6th centuries BC were a period without any influence of ancient Near Eastern arts on central Asia, a region where the steppe traditions originated and developed independently. The kurgans of Arzhan-1,[14] Arzhan-2,[15] Chilikty[16] and Taldi-2[17] show almost no influence from the Near East, except perhaps in some goldsmithing techniques such as granulation and the addition of coloured faience inlays,[18] or the possible import of fine woven textiles.

[12] Simpson and Pankova eds 2017: 300, cat. 214 (National Museum of the Republic of Kazakhstan, inv. nr. 2213, replica); see Summerer and Lukpanova, this volume.
[13] Wu 2010.
[14] Gryaznov 1950; 1984.
[15] See above n. 10.
[16] Chernikov 1965.
[17] Beisenov 2013*a*.
[18] Armbruster 2007; see some imported bleached beads at Arzhan-2 (see Simpson, this volume). The recent discoveries in a tomb at Eleke-Sazy (Targabatay, eastern Kazakhstan) seem to belong to the same period as Chilikty.

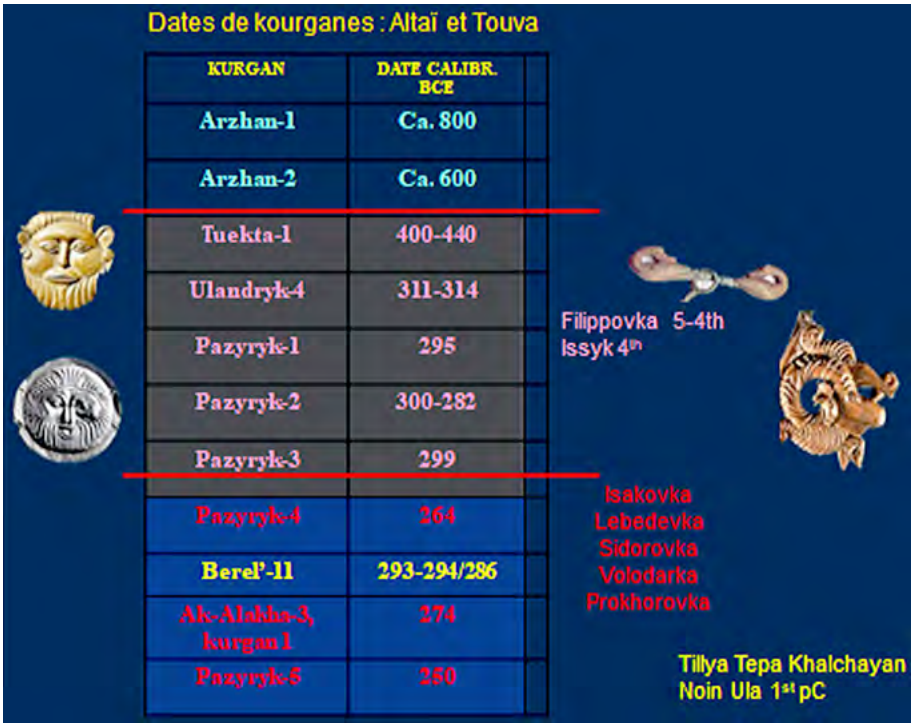

Figure 2. Chronological chart based on published dates

The situation began to change during the 5th and 4th centuries BC when Achaemenid influence begins to become evident, albeit to a limited degree, on the steppe arts of central Asia as evident from Tuekta 1 and Bashadar, but apparently limited to some non-figural ornaments appearing among horse-trappings.[19] The kurgans of Pazyryk 1, Pazyryk 2 and Pazyryk 3, dating to the turn of the 4th to 3rd centuries BC, exhibit a fair quantity of Achaemenid-related artefacts, again horse-trappings as well as felt ornaments, which clearly exhibit Persian-inspired faunal elements such as geese (or swans) with reversed heads, heads of lions with curling manes, heads of wild sheep with chevrons on their horns, and so-called Bes faces.[20] A possibly imported belt plaque from Pazyryk 2 represents a lion and ibex, and in the same burial a horned lion ('lion griffin') decorates the terminals of a wooden torc.[21] As discussed further below, a number of imported and imitated Achaemenid artefacts have been found in the southern Urals in the Filippovka kurgans and Taksai-1 in neighbouring Kazakhstan,[22] as well as at Issyk in Semirechye (southeast Kazakhstan).[23]

Much more intense links with Persian as well as Greek art appear during the 3rd century BC with imported artefacts: this follows the collapse of the Achaemenid empire and occurs during the period of Seleucid, early Parthian and Greco-Bactrian rule in central Asia,[24] and the Zhou dynasty in China. In addition to finds from Berel'11,[25] Pazyryk 4, Pazyryk 5,[26] and Ak-Alakha 3 (kurgan 1),[27] we should add finds from the burials of Isakovka, Lebedevka, Sidorovka, Volodarka and Prokhorovka in the southern Urals region, regardless of some chronological ambiguities, as they also contain imported and re-used Achaemenid and/or Greek-looking artefacts, again discussed at greater length below.

Finally, between the 2nd century BC and 2nd century AD there was an intensification of Hellenisation and an expansion of connections between the Mediterranean, Mongolia and China. Perhaps without coincidence, this was a period when the Saka-Yuezhi, Kushans, Xiongnu, Han and Parthian peoples were in movement, and a period when the networks of interrelations expanded and intensified with Greco-Roman influences, marking the beginning of the so-called 'Silk Road' between the 1st century BC and 1st century AD.[28] Grave-goods from Tillya tepe,[29] Sampula,[30] the Noin-Ula kurgans,[31] and the

[19] Rudenko 1960.
[20] Rudenko 1970; see above nn. 4, 6.
[21] Simpson and Pankova eds 2017: 110, cat. 34 (State Hermitage Museum, inv. nr. 1684/179).
[22] Treister and Yablonsky eds 2012; Lukpanova 2015; Simpson and Pankova eds 2017: 303, cat. 218 (National Museum of the Republic of Kazakhstan, inv. nr. TK2-931); Satubaldin *et al.*, this volume, Shablavina, this volume.
[23] Akishev 1978; Simpson and Pankova eds 2017: 302, cat. 217 (National Museum of the Republic of Kazakhstan, inv. nr. TK1-1845).
[24] See sites such as Ai Khanum, Takht-i Sangin and Nisa, among others.
[25] Francfort, Ligabue and Samashev 1998; 2000; Samashev *et al.* 1998; 2000*a*; 2000*b*; Stark *et al.* 2012.
[26] Rudenko 1970.
[27] Polosmak 1994*a*; 1994*b*; 1994*c*; 1996*a*; 1996*b*; 1998*a*; 1998*b*; 2000; 2001.
[28] Bernard 2005; Cunliffe 2015.
[29] Francfort 2011; Sarianidi 1985; 1989; Schiltz 2006; 2012.
[30] Keller 2001; Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001.
[31] Francfort 2014; Polosmak 2011; 2015; Polosmak, Bogdanov and Ceveendorzh 2011; Rudenko 1969; Schaefer 1943; Treister 2016.

Khalchayan monument in central Asia,[32] illustrate the strength and direction of these important connections during the 1st century.

Before exploring this in further detail, we should briefly outline the basic non-figural ornamental patterns which may be considered of Achaemenid or Greek origin:[33]

- various forms of palmette;[34]
- lotus buds or flowers;[35]
- scroll bands;[36]
- waves;[37]
- beads and reel;[38]
- egg and tongue band (but without the dart motif).[39]

Greek or Greco-Persian motifs encountered in the Altai also include a few basic compositions:

- a satyr head with palmette-like headdress (Figure 3);[40]
- the scalloped mane of a griffin (Figure 5);[41]
- the long neck with acanthus-like wings of a griffin[42] (Figure 3).

In order to illustrate the transformations and combination of steppe and ancient Near Eastern motifs, we can take a look at two examples of horse harness from Pazyryk 1. The first is a chest-strap decorated with palmettes and 'fantastic eagles' in gilded wood.[43] We should note that the palmette has three leaves (or petals) and is flanked by two curved motifs resembling brackets, some ending in scrolls: it seems that this design derives from the shape of the lotus bud and flowers which was widespread in Achaemenid art and had numerous variations ranging from a single bud to many petals (or leaves). The 'fantastic eagle' also appears on our second example, a magnificent bridle from Pazyryk 1 (Figure 5).[44] There it finds its place among four other motifs, all possibly derived from Achaemenid or Greek art. The waves decorating the forks of the cheek-pieces are clear: the

Figure 3. Satyr-like face as a leather cut-out, Pazyryk 1 (after Rudenko 1970: fig. 138f–g)

rapacious birds or griffin heads on the terminals of the cheek-pieces are of two types. The first of these, with a scalloped mane, has long been compared with 'Greco-Persian' griffin representations widespread during the 4th century BC. The second, which recurs three times here, is remarkably similar in the shape and rendering of the mane to the *protomai* on Greek Tarentine and Apulian rhyta of the late 4th century BC,[45] as discussed by Minardi,[46] and some other specimens, whether painted or plain, in various museums.[47] The splendidly stylised mouflon (or argali) heads with reduced bodies, which appear to be devoured by wolves with horned heads, present in at least two cases a typical feature of decorated horn which also appears in Achaemenid art and consists of a series of three notches, representing

[32] Pugachenkova 1966; 1971.
[33] Rudenko 1958; Azarpay 1959; Lerner 1991.
[34] See below; Rudenko 1970: pls 79–82.
[35] Tuekta 1: Rudenko 1960: pls LXXXII–LXXXIII, LXXXVIII–LXXXIX; Pazyryk 2: Rudenko 1970: pls 87c, 148b–c, 150c, 159b–c; Berel'11: Samashev and Mylnikov 2004: figs 222–23, 241–44.
[36] Pazyryk 2: Rudenko 1970: pl. 67F.
[37] Bashadar 2: Rudenko 1960: pl. XLVII.2; Pazyryk 1: Rudenko 1970: pl. 86c–d; Pazyryk 5: Rudenko 1970: pl. 118Cc.
[38] Pazyryk 1–4: Rudenko 1970: pl. 51; Pazyryk 3: Rudenko 1970: 67, fig. 18.
[39] Bashadar 2: Rudenko 1960: pl. XLVII.1.
[40] Pazyryk 1: Rudenko 1970: pl. 138f–g.
[41] Pazyryk 1: Rudenko 1970: pls 81b, 86c.
[42] Pazyryk 1: Rudenko 1970: pl. 86a–b; Simpson and Pankova eds 2017: 238–39, cat. 160 (State Hermitage Museum, inv. nr. 1295/400).
[43] Simpson and Pankova eds 2017: 240–41, cat. 162 (State Hermitage Museum, inv. nr. 1687/195, 196–200, 207–10, 211–13).
[44] Simpson and Pankova eds 2017: 238–39, cat. 160 (State Hermitage Museum, inv. nr. 1295/400).
[45] Hoffmann 1966: 56–57, pl. 47.2.
[46] Minardi 2015: fig. 24, but the Kalaly-Gyr griffin is typically Persepolitan whereas the Apulian examples are not.
[47] Terracotta Apulian griffin's head rhyton (https://collections.mfa.org/search/objects/*/griffin%20head: Boston Museum of Fine Arts, inv. nr. 00361).

Figure 4. Satyr face on an Achaemenid jug found at Susa, Iran (Musée du Louvre, inv. nr. AO 2748; photograph: author)

growth lines (Figure 5), and seen for instance on a gilt-silver amphora handle from the Oxus Treasure,[48] as well as two gilt-silver amphora handles, one in the Musée du Louvre and the other in the Museum für Vorderasiatische Kunst in Berlin, where the hind legs rise from the vessel attachment plate which itself is in the form of a satyr head topped with a palmette, thus resembling the Egyptian dwarf-god Bes (Figure 4).[49]

Returning to the motif of the 'fantastic eagle' (Figure 5 centre), we can see that its head is consistent with classic steppe eagles but the shape of the wing and tail feathers are unique and form a sort of chalice; moreover, the curve of the wings scrolls upwards in a very distinctive way. In this case we may question whether there is some influence of forms from beyond the steppe and suggest it recalls an acanthus leaf, now viewed upside down (an irrelevance for an item of horse-tack) and compare it with similar acanthus leaves represented on slightly later stone capitals and terracotta winged antefixes from Ai Khanum.[50] Historically, a few of these decorative and non-figural patterns first appear on horse-trappings from Bashadar 2 and Tuekta 1, where they were largely dominated by local steppe shapes such as a 'dot-comma', 'eye-beak' and beads, along with felines and birds of prey.

In the case of the later Pazyryk culture, we note that at Berel'11, Ak-Alakha 3 (kurgan 1) and Pazyryk 5 there is a broader choice of patterns which appears to have been a set developed by Altaian artists: the meander shape, for example, and other common motifs known in the Mediterranean and Near East are almost non-existent and were never really adopted. However, artistic themes and motifs of Persian or Greek origin are combined with and dominated by classic steppe motifs. The latter originated in inner Asia in the areas of the Altai and Tuva, as demonstrated long ago by M. Gryaznov and J. Sher,[51] and confirmed by more recent excavations at Arzhan-1 and Arzhan-2. At Berel'11, the wooden lid of the coffin displays both steppe and Persian motifs: four bronze eagles top four bronze nails in the steppe tradition,[52] but used alongside a row of gilded wooden sphinxes which served as guardians in the ancient Near Eastern tradition; a scroll of beads on a fragment of dress again points to the Near East, while a predation scene of a tiger leaping onto a deer which was carved on a rectangular gilded wooden belt plaque belongs to the art of the steppe.[53] The new shape of a small Achaemenid sphinx found at Berel'11 (measuring only 5 cm in height) has a feline body but the turned head with its open mouth is topped by strange headgear resembling a palmette.[54] We might note here the comparable satyr head with palmette headdress found at Pazyryk 1 which was inspired by the handles on Achaemenid amphorae (Figures 3-4).[55] Similarly, we see that the Persian sphinxes appear in Bactria on two roundels in the Oxus Treasure,[56] as well as some highly stylised stone seals carved under the influence of the arts of the steppe.[57]

[48] Dalton 1964: 5–6, cat. 10, pl. V; Curtis and Tallis eds 2005: 125, cat. 127 (British Museum, inv. nr. 123911).

[49] Curtis and Tallis eds 2005: 125, cat. 128 (Musée du Louvre, inv. nr. AO 2748, Tyzskiewicz collection, acquired in 1898); Sarre 1921: 59, pl. 49 (Museum für Vorderasiatische Kunst, Berlin, inv. nr. 8180); Amandry 1959: 50, pls 26, 2; 27, 2-3; 28, 4 but the captions on p. 56 indicate the Louvre for all; both are illustrated together facing each other in *SPA*, pl. 112.

[50] Cambon and Jarrige eds 2006: 157–59, cats 27 (National Museum of Afghanistan, inv. nr. MK 05.42.82/1), with commentary by Paul Bernard on pp. 267–68 remarking on the strange vegetal and zoomorphic composition of the antefix.

[51] Sher 1992; 2000.

[52] Simpson and Pankova eds 2017: 305, cat. 221 (National Museum of the Republic of Kazakhstan, inv. nr. 408).

[53] Samashev and Mylnikov 2004: figs 181–83; Francfort, Ligabue and Samashev 2006: fig. 10.

[54] Samashev and Mylnikov 2004: figs 184–86; Francfort, Ligabue and Samashev 2006: fig. 12; Samashev 2012: figs 2.20, 2.21.

[55] Rudenko 1970: pl. 91–92.

[56] Dalton 1964: 14, cats 26–27, pls XII, XXI; cf. Curtis and Tallis eds 2005: 146–47, cats 186–87 (British Museum, inv. nrs 123927, 123928).

[57] Francfort 2007; 2013: 70. An anonymous reviewer of this paper remarked also that 'it is worth remarking on how one of these is completely non-conventional as it faces to its rear and towards its wing which is in the form of a rearing horned griffin'.

Figure 5. Bridle, Pazyryk culture, 5th century BC, Pazyryk 1 (The State Hermitage Museum, St. Petersburg, inv. nr. 1295-400; photograph: Vladimir Terebenin / Alexander Lavrentyev)

Multiple transformations of Achaemenid arts occurred across the vast region between Bactria and the Altai. The horse-trappings found in the frozen burials generally exhibit a complex artistic composition. For instance, at Berel'11, as in other kurgans in the Altai, each of the 13 horses possesses its own consistent iconographic theme: to mention only the Achaemenid-inspired ones (other horses exhibit clear steppe-tradition motifs), there are a mouflon, eagle(s), a large feline, a lion and a horned lion. Each theme appears on several bridles and saddles, including pendants, cheek-pieces and frontals, but always systematically consistent as observed before.[58] At Pazyryk 1 and 5, steppe and Achaemenidising motifs occasionally appear on the same bridle or saddle but are re-interpreted in a local steppe art tradition (Figures 5–6).[59] We can only suggest that this was an entirely local social intention on the part of the patrons, and an aesthetic choice on the part of the artists to select a theme originating in Achaemenid imperial court art rather than something drawn from local tradition.

Selected non-figural ornaments, themes and patterns

Palmettes are typical of Greek and Persian arts, and are present on the bridles of six horses from Pazyryk 1 (Figure 6),[60] another from Pazyryk 5, one from Pazyryk 2, two from Berel' 11, one from Ak-Alakha 1 (kurgan 1), and four from Ak-Alakha 3 (kurgan 1), the last being the burial excavated by Dr N. Polosmak of the so-called 'princess' or 'shamaness', a young woman who evidently belonged to the local elite. The palmettes may have three, five or six petals (leaves) separated by brackets and scrolls, and resemble the Persian and Greek prototypes.[61] Thanks to the detailed excavation report for Ak-Alakha 3 we have very important data for our analysis (Figure 7).[62] The first horse was not well-preserved. The second horse harness is typically steppic with a series of griffin heads. With the fourth horse, we are facing a complete set of palmettes, or possibly lotus flowers (the petals being replaced by beads) (Figure 8).[63]

Figure 6. Chest-strap, Pazyryk culture (The State Hermitage Museum, St. Petersburg, inv. nr. 1295-420; photograph: Vladimir Terebenin / Alexander Lavrentyev)

[58] Francfort, Ligabue and Samashev 2006; Samashev *et al*. 2000*a*.

[59] Simpson and Pankova eds 2017: 240–41, cats 161–62 (State Hermitage Museum, inv. nrs 1295/420, 1687/195, 196–200, 207–10, 211–13).

[60] Simpson and Pankova eds 2017: 240, cat. 161 (State Hermitage Museum, inv. nr. 1295/420).

[61] Curtis and Tallis eds 2005: 84, cat. 46 (British Museum, inv. nr. 129381; = originally from Palace G of Artaxerxes III, 425–338 BC). There were seven petals at Persepolis; Boardman 2000: figs 2.54–55, 2.66 (nine petals at Persepolis and Susa), 5.71 (seven and three petals – under the flower – at Duvanli), 5.73 (five and seven petals at Kazbag, for example, but there are many more).

[62] Polosmak 2001.

[63] Polosmak 2001: 80–81, figs 55–57.

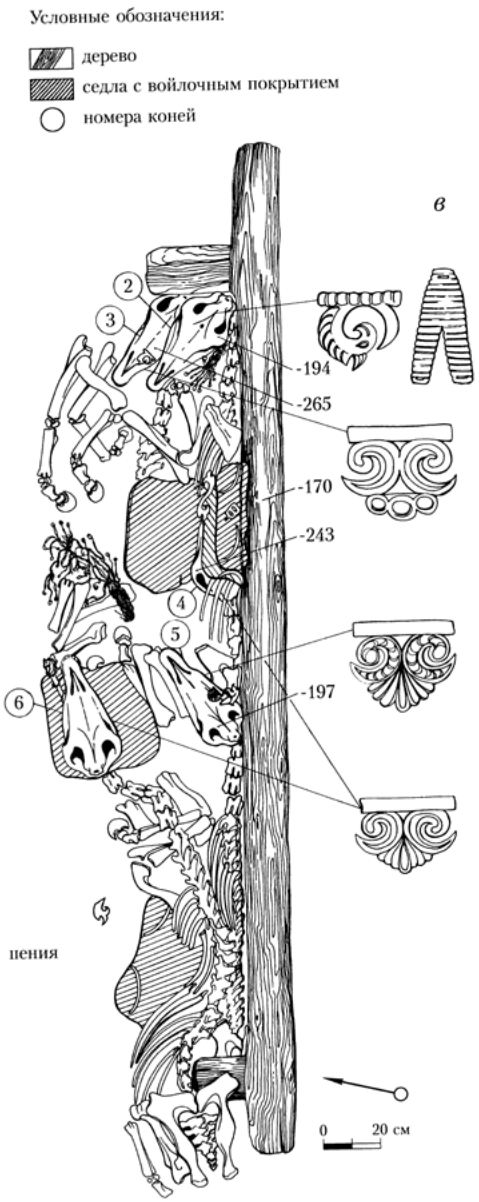

Figure 7. Burial at Ak-Alakha 3, kurgan 1: plan of horse burials (after Polosmak 2001: pl. V)

The sixth horse harness combines typical steppe griffin heads with five petalled palmettes, as do the bridles of the fifth and sixth horses (Figure 9).[64] If we examine the forks of the cheek-pieces we can also observe other interesting motifs: the second and third show simple geometric designs, the fifth displays crescentic ornaments and saiga heads belonging to the steppe tradition (Figure 10a–b), and the sixth is adorned with a kind of egg-motif which was partially transformed into petals, and may also be of Near Eastern derivation. In contrast, the fourth set is truly original as the two arms of the forks bear crescents but at their basis we see two levels of symmetrical 'question mark' scroll patterns, possibly deriving from a Hellenistic model as the same motif appears on the 'palmette antefixes' of Ai

[64] Polosmak 2001: 82–86, figs 58–62.

Figure 8. Burial at Ak-Alakha 3, kurgan 1: bridle ornaments of horse 4 (after Polosmak 2001: fig. 58b)

Figure 9. Burial at Ak-Alakha 3, kurgan 1: bridle ornaments of horse 6 (after Polosmak 2001: fig. 62a)

Khanum,[65] and a floor mosaic inside the bathroom of the palace at the same site. This comparison corroborates the radiocarbon and dendrochronologies and analogies made by N. Polosmak.[66] Regarding the palmette, N. Polosmak suggests that they may represent 'the wings

[65] Cambon and Jarrige eds 2006: 158–59, cats 25–28 (National Museum of Afghanistan, inv. nr. MK 05.42.84/1; 04.42.84/2-8; 05.42.84/12-19), with commentary by Paul Bernard on pp. 267–68 with relevant remarks about the shapes and transformation of the original design.
[66] Polosmak 2001: 83, n.

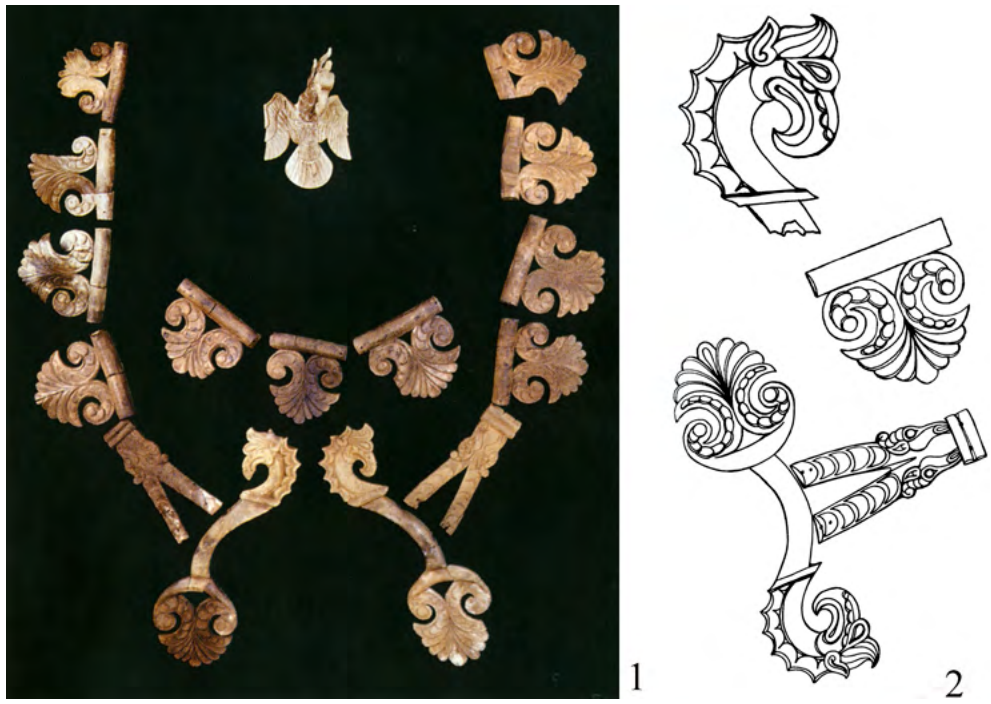

Figure 10. Burial at Ak-Alakha 3, kurgan 1: bridle ornaments of horse 5 (after Polosmak 2001: fig. 59)

and tail of a griffin, stylised'.[67] This is an accurate observation as, in many cases, it is possible to observe a transformation of shapes which may correspond with a new steppic interpretation of a pattern or design drawn from the Greco-Persian art of the Near East. At Ak-Alakha 3 (kurgan 1), the palmette has a peculiar shape, is carved from wood and used as a harness pendant along with griffins' heads with scalloped manes.[68] Did it come directly from the Hellenised world or did it come via Iran? (Figure 10).

Another interesting ornamental composition which travelled equally far was the palmette flanked by a pair of bird *protomai*. This is a well-known Achaemenid composition found, for instance on a grey stone tray from the Treasury at Persepolis (where the birds are geese),[69] and a silver bowl from Armenia;[70] more unexpected parallels come from far-away China, for instance on a bronze piece of Sino-Siberian art in the C.T. Loo collection,[71] and excavations of a burial at Chenyangchuan in Ningxia revealed a bronze ornament with a similar composition on a horse harness piece (Figure 11). However, at Berel'11 the horned lion, discussed below, is reduced to tin-covered wooden horse pendants, and appears on some pieces

Figure 11. Palmette and raptor heads, bronze from Chenyangchuan (after Bunker *et al.* 1997: fig. A45)

as a recumbent figure on a four petalled lyre-palmette where it is flanked by the heads of long-necked birds of prey (Figure 12).[72] Thus, the palmette and associated bird motif probably also originated in the Persian empire.

The frieze of a stylised lotus flower and bud also travelled far from its late Assyrian origin, via Iran up

[67] Polosmak 2001: 79, n.
[68] Originating possibly in the Greco-Persian art of the Black Sea: see above.
[69] Schmidt 1957: 88, pls 53.2, 54.2 (described as swans); cf. Curtis and Tallis eds 2005: 130, cat. 148 (described as ducks' heads, National Museum of Iran, inv. nr. 2199: the grey stone was probably chosen in imitation of silver and the same criterion applies to long shallow scoops found at Altıntepe (silver), Persepolis (stone) and Tell ed-Deim (pottery).
[70] Boardman 2000: fig. 5.73.
[71] Salmony 1933.
[72] Francfort, Ligabue and Samashev 2006: fig. 15.

Figure 12. Palmette, raptor heads and horned lion from wood covered with tin from Berel'11, Kazakhstan (after Francfort, Ligabue and Samashev 2006: fig. 15; photograph CNRS/MAFAC)

to the Altai where it became part of horse trappings or was placed on textiles at Pazyryk. The same motif, undoubtedly Persian in origin, is found embroidered on a pair of trousers from Dzhumbulak Kum in the Taklamakan desert in Xinjiang Autonomous Uighur Province (People's Republic of China), where it is dated to the mid-1st millennium BC (Figure 13).[73] There, very high headdresses of Saka type were worn by ladies, testifying to the common dress and headgear shapes in the steppe world and this region. Its presence at Berel'11 is not surprising. The occurrence at Pazyryk 5 of lotus buds arranged in the form of a symmetrical cross is especially interesting (Figure 14),[74] and the same design recurs on bronze plaques set on the doors of the temple of Ai Khanum, the Hellenistic city of Bactria, in the 3rd–2nd centuries BC: these may have been removed from an earlier Achaemenid monument and one depicts lotus buds and a flower in the form of a palmette (Figure 15a-b).[75]

The question therefore arises as to how these motifs entered inner Asia: was it via the arts of the Persian empire and through the 'Upper Satrapies' of Bactria, Chorasmia or Sogdiana, or was it through the direct nomadic Eurasian steppe route where finds from sites

Figure 13. Lotus ornament on cloth trousers from Dzhambulak Kum (Xinjiang Institute of Archaeology, Urumqi, PRC; photograph CNRS/MAFCX)

Figure 14. Detail of lotus bud of the frieze bordering an audience scene on a felt hanging from Pazyryk 5 (The State Hermitage Museum, St. Petersburg; after Rudenko 1970: pl. 145)

in the southern Urals, such as Filippovka and Taksai-1, demonstrate the circulation of Achaemenid and/or Achaemenid-related objects. In the Pazyryk 5 kurgan, imported textiles – including the famous carpet with Persian-looking ornaments and a procession frieze – originate from the Achaemenid empire, the carpet itself possibly having been manufactured in Bactria.[76] The inlaid gold earrings from Pazyryk 2 also appear to be imports.[77] The same applies to the fragmentary embroidered textile from Pazyryk 5 depicting two women in Persian dress engaged in a cultic scene, with ornamental elements figuring fortifications,[78] which is similar to those decorating the dress of Persian guards represented on glazed composition bricks from the palace of Darius I (550–487 BC) at Susa.[79] From the same kurgan comes a textile decorated with a typical Persian 'frieze of passing lions', known not only here in

[73] Francfort, Idriss and Zhang 2001: this discovery was by a joint expedition of our team and the Xinjiang Institute of Archaeology (Mission Archéologique Franco-Chinoise).
[74] Rudenko 1970: pl. 154; see also Rudenko 1970: pls 150c, 159b–c.
[75] Francfort 1984: 58–59, nos 29a–b, pl. 21, pl. XXII; Cambon and Jarrige eds 2006: 154, cat. 17 (National Museum of Afghanistan, inv. nr. MK04.42.12).
[76] Simpson and Pankova eds 2017: 281, fig. 161 (State Hermitage Museum, inv. nr. 1687/93).
[77] Simpson and Pankova eds 2017: 136, cat. 66 (State Hermitage Museum, inv. nr. 1684/182–83).
[78] Simpson and Pankova eds 2017: 282, fig. 162 (State Hermitage Museum, inv. nr. 1687/100).
[79] Curtis and Tallis eds 2005: 88, cat. 53 (Musée du Louvre, inv. nr. Sb 21240).

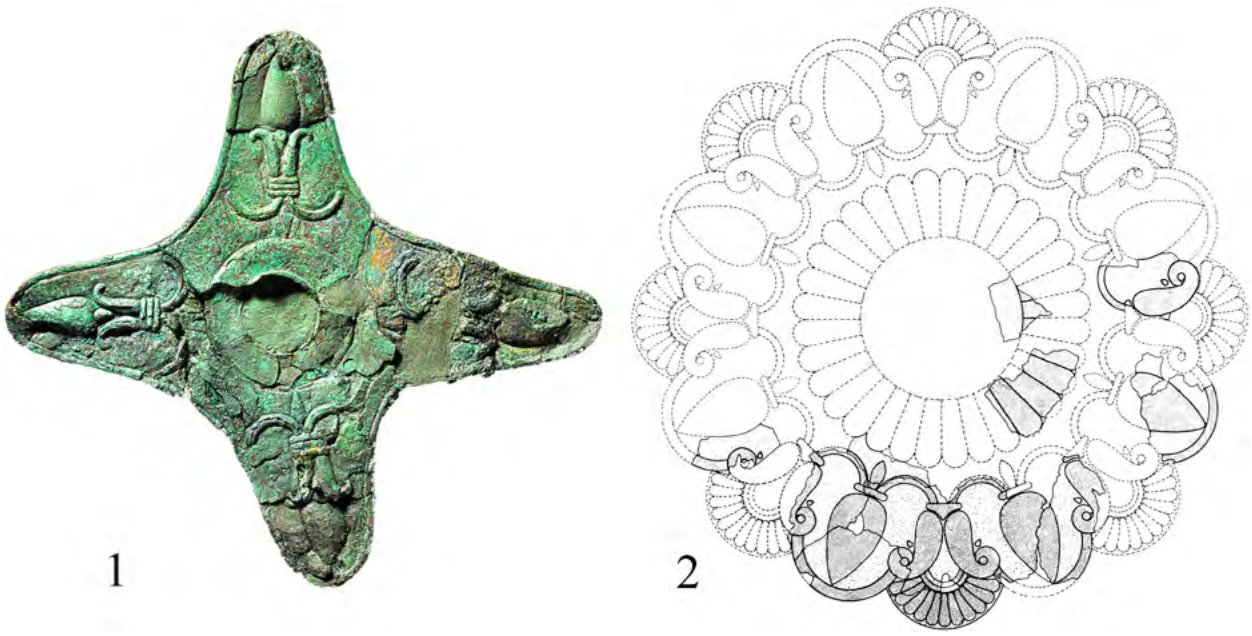

Figure 15. Lotus ornament on a bronze plaque from the temple at Ai Khanum: 1, photograph (National Museum of Afghanistan; after Cambon and Jarrige eds 2006: 154, cat. 17); 2, drawing (after Francfort 1984: pl. 21.29b: drawing by J.-Cl. Liger)

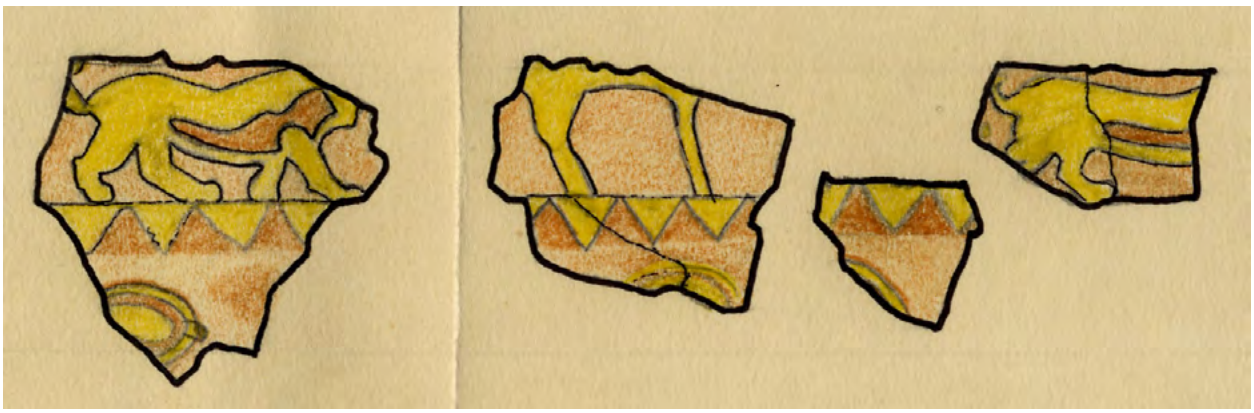

Figure 16. Frieze of 'passing lions': painting on wood, Ai Khanum temple (after Francfort 1984: pl. 16.20; drawing made by the late R. Audouin in the field, 1968)

the Altai, but also carved at Persepolis,[80] represented on moulded glazed bricks at Susa, and originating in late Assyrian art. The same 'frieze of passing lions' recurs on an important but generally overlooked piece, a fragment of painting on wood discovered in a Hellenistic temple at Ai Khanum, which displays precisely the same colours and bands of triangular borders as the textile from Pazyryk (Figure 16).[81]

The mouflon represented on the Berel'11 tacks is simply reduced to a head but Persian stylistic traits appear on the horns.[82] Moreover, a row of ornamental beads is of Persian origin too as this pattern does not originate on the steppe. Some Pazyryk mouflons nevertheless display small legs and reduced bodies with a stylistic trait typical of the steppe arts: the reversed hindquarters (Figure 5).[83] This *leitmotif* is a very important stylistic trait in steppe art and was widespread from Bactria to Tuva, Altai and China.

The motif of a lion's head with a curling mane is another very important motif showing how Persian art entered that of the steppe. The lion is absent from the native fauna of the Altai (or indeed central Asia at this period) but appears, in my opinion, on a tattoo on the chest of the man found in Pazyryk 5 which was recently

[80] Simpson and Pankova eds 2017: 306–307, cat. no. 223 (State Hermitage Museum, inv. nr. 1687/100b).
[81] Francfort 1984: 32–34, no. 20, pl. 16, pl. XV.
[82] Samashev and Mylnikov 2004: figs 217–19, 237–38; Samashev 2012: figs 2–8.
[83] Simpson and Pankova eds 2017: 238–39, cat. 160 (State Hermitage Museum, inv. nr. 1295/400).

revealed by infrared imaging. The authors of this important publication identify the design as a tiger.[84] This is possible but the absence of stripes (or spots in the case of a leopard) on the body of the large feline, the enormous mass of its mane and, above all, the eye which is depicted in profile in typical ancient Near Eastern manner – rather than *en face* as was normal in steppe art – instead suggest that it is intended to be a lion. In short, we again seem to see the adaptation of an Achaemenid motif to steppe art, in this case literally applied to the body of a person from the Altai. Heads of lions with curling manes are known on Achaemenid gold appliqués,[85] glazed bricks from Susa[86] and a frieze border on a felt rug from Pazyryk.[87] However, at Berel'11, the design is transformed into the head of an eagle grasping a mouflon's head in its beak, then conflated into a composition reproducing in a sort of synthesis the shape and proportions of the Persian lion's head with its curling mane.[88] Leather cheek-piece ornaments found at Pazyryk 2 show the same way of re-designing an Achaemenid lion with its curling mane by combining two animals – a lion and herbivore – into a steppe interpretation.[89] The Berel'11 wood carvers created a similar type of motif conflation or synthesis by using the Persian-originating face of Bes with a feline face derived from horned lions re-interpreted in steppe manner.[90]

Figure 17. Addorsed griffin protomes on a stone column capital from Persepolis, Iran (photograph: author)

Let us look now at a typical Achaemenid Persepolitan-type griffin with its distinctive brush-like mane, leaf-shaped ears, half-open beak and protruding eyes (Figure 17). This inspired a miniature three-dimensional statuette with leather horns and wings which adorned the head of a horse at Berel'11.[91] All the components are there and inspired by Persian art. However, in the present state of knowledge, it is not Bactria but Chorasmia which gives the intermediary find: a fragmentary Persepolitan griffin head mould from the palace of Kalaly-Gyr excavated by Tolstov.[92]

The Persepolitan griffin, from Persepolis to Chorasmia and Bactria, did not stop there and is another splendid example of the selection and adaptation of Achaemenid arts, themes and motifs to the needs of the nomads. It is also testimony to their aesthetic sense by which they integrated elements drawn from the monumental and portable material culture of the Persian court to their own traditions of style, arts, society and ideology.

The horned lion motif is another case which was common across central Asia and as far east as China.[93] This is a typical Persian Achaemenid composite monster motif which differs to the griffin. We can trace this monster from Persepolis where it was fought by the 'hero king' on reliefs (Figure 18),[94] and in the round on column capitals (Figure 20). It also appears walking along glazed brick facades on the palace walls of Susa (Figure 19), and on many representations on seals and vessels, such as rhyta and amphora handles, as well as the Oxus Treasure aigrette in the British Museum.[95] In each case it is easily recognisable because of its mane, horns, wings, paws and its typical scorpion tail. It re-appears at Berel'11 where it is carved in a naïve shape and simple style as cheek-piece forks, and features in a recumbent position above a palmette and flanked by two eagle heads (Figure 12).[96] However, in the same kurgan, this monster re-appears in a very sophisticated intonation where all the classic elements are reproduced but in a developed pre-existing steppe style where it is depicted both in face and profile, and we can recognise its eyes, eyebrows, horns, collar, mane, nostrils, paws and the ruff with a typical Persian 'drop' pattern.[97] From the Iranian capital cities and

[84] Barkova and Pankova 2005.
[85] Simpson and Pankova eds 2017: 275, fig. 158 (Metropolitan Museum of Art, inv. nr. 56.154.2).
[86] Simpson and Pankova eds 2017: 275, fig. 157 (Musée du Louvre, inv. nr. Sb 3336).
[87] Simpson and Pankova eds 2017: 275, cat. 189 (State Hermitage Museum, inv. nr. 1295/52).
[88] Samashev and Mylnikov 2004: figs 220–21, 255–58; Francfort, Ligabue and Samashev 2006: fig. 13.
[89] Rudenko 1970: 147, fig. 75.
[90] Samashev and Mylnikov 2004: figs 189–90; Samashev 2012: fig. 2.9.
[91] Francfort, Ligabue and Samashev 2006: fig. 14; Samashev and Mylnikov 2004: 306–307, fig. 36, photographed fig. 306 with leaf-shaped ears similar to the Persepolis griffin too; Samashev 2012: fig. 2.19 (Dr Samashev proposes it topped a standard).
[92] Tolstov 1958: 158, fig. 61; for comparisons see Francfort 2007.
[93] Francfort 2007 for an overview.
[94] Curtis and Tallis eds 2005: 82, cats 41–42.
[95] Dalton 1964: 11–13, cat. 23, pl. I; Simpson and Pankova eds 2017: 314, cat. 225 (British Museum, inv. nr. 1897,1231.23).
[96] Samashev 2012: fig. 2.11; Samashev and Mylnikov 2004: figs 265–66; Francfort 2007: fig. 6.8.
[97] Samashev and Mylnikov 2004: figs 191–94; Francfort, Ligabue and Samashev 2006: fig. 17; Francfort 2007: figs 7–9.

Figure 18. 'Royal hero' in combat with a horned lion on a stone relief at Persepolis, Iran (photograph: author)

in addition to naïve versions, more elaborate figures appear not only at Pazyryk, notably on a splendid torc from the Siberian Collection of Peter the Great which elegantly combines the shape of the torc with the inlaid body and all the diagnostic details of the muzzle, eyes, horns and scorpion tail (Figure 21).[100] Horned lions also appear at Pazyryk 5 on wooden crupper ornaments and saddle pendants (Figure 22, 1–3).[101] This motif is sophisticated and combines face and profile with all the elements listed above. The leonine head is carved in 'split representation', i.e. *en face* but the horns are curved, and we see all of the features of lions represented in profile in Achaemenid art (Figure 23). The Pazyryk 5 beast's body also possesses the typical segmented scorpion tail (Figure 24, 1). Interestingly, this very specific depiction is found three centuries later in Bactria in the mid-1st century burial 4 at Tillya tepe where it features on a gold dagger sheath inlaid with turquoise,[102] and combined with a pair of mouflon heads shown *en face* which are similar to those of Pazyryk 1 (Figure 24, 2).[103] The links of the Tillya tepe finds with Altai have been noted before.[104] It seems probable that the horned lion motif returned to Bactria from the Altai region where it had been introduced 300 years before. A possible historical explanation is a Yuezhi/Ruzhi nomadic migration from central Asia to Altai after Alexander's conquest, as recorded by Sima Qian, and their return to Bactria around 130 BC, following the collapse of Greek power, as part of the historically attested 'Saka-Yuezhi' tribal migration from the eastern steppe. Some scholars, notably

Figure 19. Horned lions walking and frieze of lotus and palmettes on glazed bricks from Susa, Iran (Musée du Louvre; photograph: author)

monumental art, the horned lion motif travelled with the peripatetic Persian Court to central Asia and Bactria, where it ends up as a design within the Oxus Treasure. The same motif re-appears on ornaments at Pazyryk 2,[98] and as far east as Xinjiang.[99] However,

[98] Rudenko 1970: 102, fig. 45, pls 68d–e, 159a.
[99] Debaine-Francfort 1990; Zongguo and Xinjiang eds 2002: 30–31.
[100] Simpson and Pankova eds 2017: 63, cat. 21 (State Hermitage Museum, inv. nr. Si 1727 1/62).
[101] Rudenko 1970: 172, fig. 88, pl. 116f.; Simpson and Pankova eds 2017: 240–41, cat. 162 (State Hermitage Museum, inv. nr. 1687/195–200, 207–13).
[102] Sarianidi 1985: 220, fig. 162; 1989: 99, fig. 34; Cambon and Jarrige eds 2006: 196, 279 cat. 114 (National Museum of Afghanistan, inv. nr. MK04.40.388).
[103] Rudenko 1970: pls 82, 83b–d.
[104] Schiltz 2006.

Figure 20. Horned lion on Achaemenid stone column capital from Persepolis, Iran (photograph: author)

the late V. Schiltz, have hypothesised about this trip from Achaemenid satrapies to Altai, and return to Bactria.[105] The Achaemenid horned lion, adopted and transformed by the steppe Altaians to be shown *en face* and in profile and later appearing in Bactria, is perhaps the first historical material evidence for such events. However, the question is not simple regarding the Scythians/Saka/Sai and Yuezhi/Ruzhi peoples, and there are multiple possible historical scenarios.[106] These observations nevertheless mean that all elements of the Persian horned lion were maintained and transformed, 'transcoded' into a specific steppe style and art, both as frontal and profile compositions, and including all the relevant iconographic features. Such an effective transmission implies that the horned lion theme was very popular on the steppe and in central Asia, perhaps because it gave a visual form or new incarnation to a pre-existing imaginary artistic monster. Indeed, some more naturalistic monsters, predators and felines can be identified in the arts of the steppe, including on petroglyphs, stelae and portable carved material culture, long before the appearance of any Achaemenid influence as they are occur as early as the Bronze Age in the Okunevo, Afanasevo and Karakol' cultures, along with all sorts of naturalistic predatory beasts.[107]

In general, the non-figural Persian or Greek-looking designs and motifs of the steppe arts of the Altai appear to have been drawn from Achaemenid monumental or minor arts, whether carved reliefs, glazed brick facades, textiles, toreutic, glyptic or imaginary composite monsters. They were introduced and inserted into the local media, artistic schemes and compositions of the steppe. Often the patterns and motifs were reconstructed following the rules of different local steppe stylistic conventions, such as the face and profile convention which was derived from the old 'split representation' known on the steppes and beyond since at least the Bronze Age. Their original Near Eastern meanings on the horse tack and furniture of the steppe tribes were lost but they retained ornamental and/or symbolic value.

We turn now to some other artistic compositions, both local steppic, imported and adapted from the Achaemenid empire. A good example of this purposeful deconstruction and reconstruction of Achaemenid art in the Pazyryk culture is offered by the 'predator composition' whereby a beast of prey attacks a herbivore. Recently, another tattoo on the skin of a mummy from Pazyryk 5 was found using infrared imaging and shown

Figure 21. Lions and horned lions on inlaid gold torcs from the Siberian collection of Peter the Great, 5th–4th century BC (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727-1/62, Z-568; photograph: Vladimir Terebenin / Alexander Lavrentyev)

[105] Schiltz 1994: 287–88, 308–10.
[106] Benjamin 2007: 30–36.
[107] There are many publications on these images, see for instance: Kubarev 1988; Savinov and Podolsky eds 1997; Francfort 1998; Leontiev, Kapelko and Esin 2006; Stepanova, Vadetskaya and Polyakov eds 2010; 2012; Vadetskaya 2016.

Figure 22. Horned lion designs: 1, saddle with horned lion face and profile on crupper, Pazyryk 5; 2, detail of pommel with horned lion face pendant; 3, detail of horned lion face, saddle-pendant, Pazyryk culture (The State Hermitage Museum, St. Petersburg, inv. nr. 1687-195; photograph: Vladimir Terebenin / Alexander Lavrentyev)

Figure 23. Detail of lion head in profile, Palace of Darius, Susa (Musée du Louvre; photograph: author)

to represent two tigers and a leopard attacking a deer and an elk.[108] The large felines rendered by the artist placed the head as if it was seen from above, or frontally, whereas the body is shown in profile. The scholars who studied the scene – L.L. Barkova and S.V. Pankova – drew accurate parallels with the arts of northwest China, particularly with images from Aluchaideng (China). However, if we return to the Persepolis Apadana terrace relief and the Treasury of the Siphnians in the sanctuary of Apollo at Delphi in Greece, we find lions in similar pose with their heads above or frontally and their body in profile as they attack a bull (at Persepolis) or

[108] Barkova and Pankova 2005; Simpson and Pankova eds 2017: 97, fig. 84.

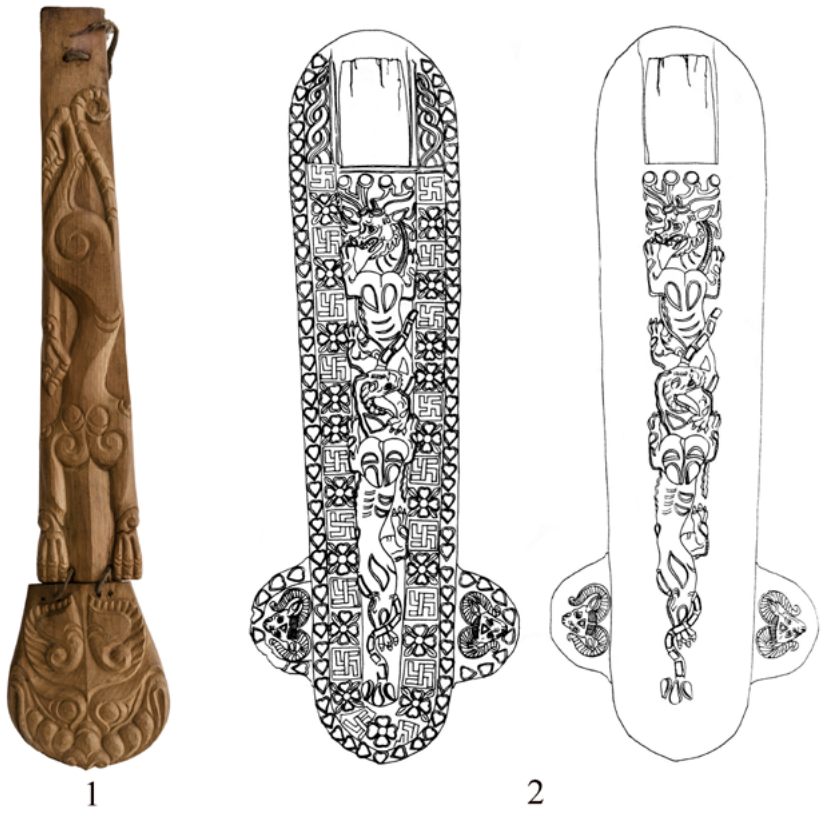

Figure 24. Horned lions: 1, carved wooden crupper ornament with horned lion seen *en face* and in profile, Pazyryk 5 (after Rudenko 1970: pl. 116F); 2, inlaid gold dagger sheath: horned lion seen *en face* and in profile, Tillya tepe burial 4 (National Museum of Afghanistan; after Sarianidi 1989: fig. 34)

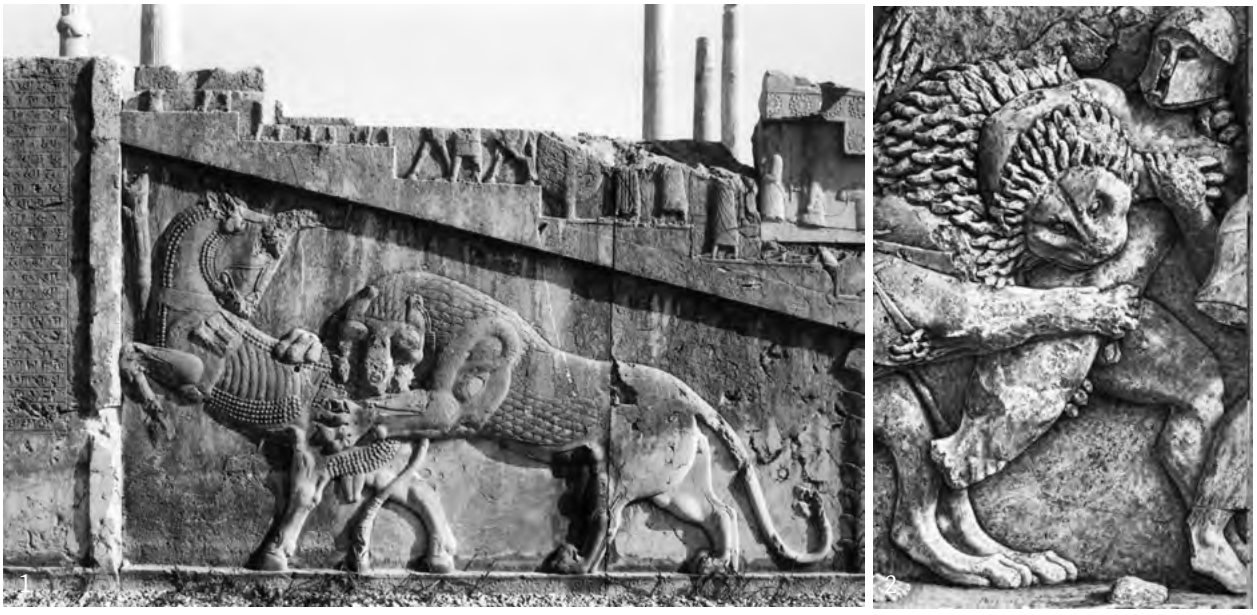

Figure 25. Lion attacking a bull: 1, Achaemenid art at Persepolis; 2, Treasury of the Siphnians in the sanctuary of Apollo at Delphi

a giant hoplite at Delphi (Figure 25, 1–2).[109] These sculptures are dated to the 6th–5th centuries BC, thus earlier than the Altai and Chinese representations. Are such an early origin and further relations possible? It is difficult to prove in the present state of the knowledge, but deserves consideration for further study within the broader context of ancient Eurasian exchanges.

As we have just seen, in the Pazyryk culture at kurgan 5, there were striking examples of wooden saddle horse-crupper ornaments carved with horned lions with their heads represented frontally and their bodies viewed in profile (Figure 22). From such compositions, the feline head, whether horned or not, is sometimes selected alone, as if extracted, and placed as an ornament on roundels sewn onto clothing. Similar leonine heads, transformed into generic feline heads, are widespread

[109] Picard and de la Coste-Messelière 1954.

1

Figure 26. Audience scenes: 1, felt hanging, Pazyryk 5 (State Hermitage Museum; after Rudenko 1970: pl. 145); 2, Achaemenid relief, Persepolis (photograph: author)

2

across Eurasia from Bactria (Oxus Treasure)[110] to Issyk,[111] the Altai and northwest China.[112] This is well-known but the important point is that predator compositions selected and re-designed in the steppe style were further developed by a second process of selection which extracted the frontal feline head and transformed it into a decorative element.

A second and perhaps the most impressive transmission from Persian regalia appears in the creation by Pazyryk Altaians of the monumental composition on the felt hanging from Pazyryk 5: this represents a scene directly inspired by the well-known 'audience scene' composition of Persian art (Figure 26, 1), which is found from Persepolis to Anatolia and the Levant on stone reliefs, seals and the so-called 'Alexander sarcophagus' from Sidon (Figure 26, 2).[113] In those cases, a person of lower rank appears in front of the sovereign and covers his mouth out of respect for him or for the fire altar depicted in the field. The king is represented as enthroned and is the tallest individual present. However, at Pazyryk there is a significant modification of the composition as the demanding person is represented at the same level as the enthroned sovereign (here substituted by a female vegetation deity), and this demanding person is riding a horse rather than being on foot. We are far from Persian Court hierarchy and from the protocol of *proskynesis* (*kowtow*): was there some sort of non-hierarchy, or indeed a different kind of hierarchy existing in the steppe societies? This is possible but, if so, the details elude us. The important point here is that the Scythian Altai nomads adopted the prestigious Persian royal composition scheme and adapted it to their own society and beliefs. Additional evidence that this scheme was inspired by Achaemenid art is provided by the framing borders of geometric motifs which consist of four stylised lotus buds in a cruciform arrangement around a central circle (Figure 26, 1; 14). Although these alternate with steppe patterns, the lotus compositions are drawn from the Achaemenid Near East (although ultimately they are of late Assyrian origin), and similar motifs are found on wooden ornaments from Tuekta 1, and bronze plaques from the temple at Ai Khanum temple (Figure 15). Lotus flower buds re-appear in a different manner as far east

[110] Dalton 1964: 17, cat. 40, pl. XII; Simpson and Pankova eds 2017: 318, cat. 230 (British Museum, inv. nr. 1897,1231.40).
[111] Akishev 1978.
[112] There are several examples but it suffices to mention these from Pazyryk 3: Rudenko 1970: pl. 104d, f–g, Pazyryk 4: Rudenko 1970: pl. 104d, f; Pazyryk 5: Rudenko 1970: pl. 104c–e.
[113] Simpson and Pankova eds 2017: 158, fig. 110 (State Hermitage Museum, inv. nr. 1687/94).

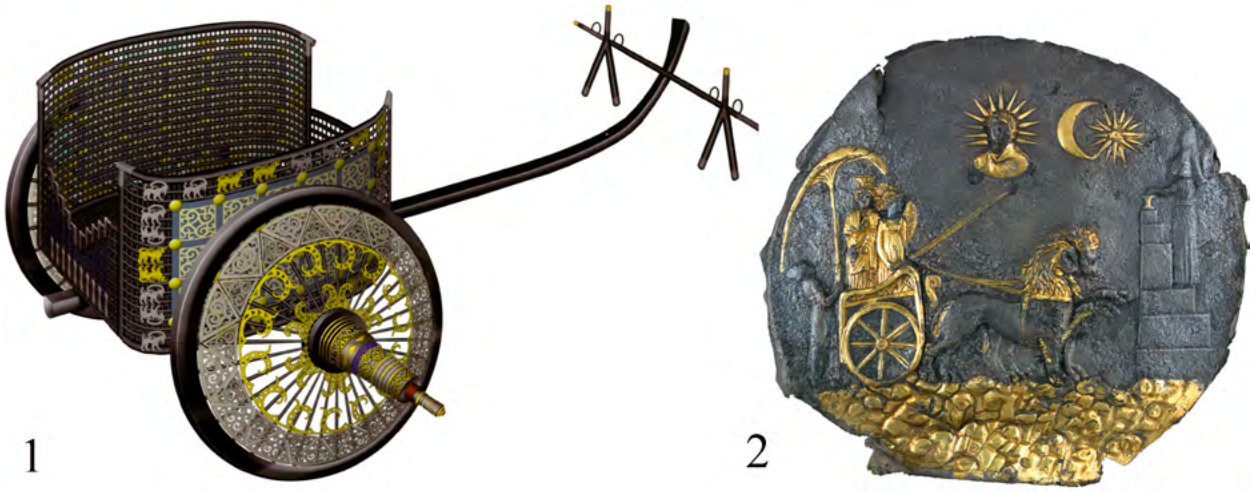

Figure 27. 1: Majiayuan (Gansu) reconstitution of type A chariot in burial M3-1 (after Gansu Sheng Wenwu Kaogu Yanjiusuo 2014: pl. 14); 2: representation of the goddess Cybele riding a chariot, gilded silver, Ai Khanum (National Museum of Afghanistan; after Cambon and Jarrige eds 2006: 156, cat. 23)

as the cemetery of Majiayuan in Gansu, where they were cut from sheet metal for use as appliqués.[114]

A third very important feature of Persian origin is the royal chariot and, with this vehicle, Achaemenid influence appears in a quite different manner on the steppe and as far east as China.[115] The image of a composition of a chariot carrying a deity or ruler, the latter frequently engaged in a hunt, was common in ancient Near Eastern art and spread from Achaemenid art into Bactria, firstly on objects in the Oxus Treasure and later into the Hellenistic period judging by evidence from Ai Khanum where the goddess Cybele is shown on a gilded silver plate within a composition which expands that seen on the coinage of Mazaios, the Achaemenid satrap of Sidon (Figure 27, 2).[116] Chariots are represented quite frequently but similar pictures are also found in China, both on silk from Mashan and on pictorial narrative bronzes, testifying to the Achaemenid origin of the choice made by Chinese art of the profile view for representing the chariot and the princely act of hunting (Figure 29). In the Altai, the unique roofed wooden cart found at Pazyryk 5, apparently useless in practical daily life in Altai, recalls images of the king (and deities) carried on a chariot beneath an umbrella which recur from Assyrian to Achaemenid art. The chariot is an attribute of the gods, kings and the king of kings. At Pazyryk, before it was interred it may have transported the embalmed corpse of a dead tribal leader around his former territories and exhibited to relatives and allies, as this practice is described by Herodotus in connection with European Scythians.[117] The crenellated ornament on a hood from the same Pazyryk kurgan is perhaps not just a reminiscence of Persia but belongs also to regalia, as only princely figures wore crenellated crowns.[118] Further east, a chariot of the 'Warring States' period which was excavated in a burial at Majiayuan in Gansu (PRC), displays a typical and very specifically Achaemenid Persian chariot form of ornament, namely a frieze of animals which is identical to representations from Persepolis (Figure 27, 1).[119] There, on the Apadana relief, the king's chariot is decorated with a frieze of walking lions, and the same is shown on the chariot of Darius III depicted on the Issos or Gaugamela battle scene on the later mosaic from Pompeii which is now in Naples Museum.[120] The fact that some of the Persian regalia were transformed and adopted by the Scythian populations of the Altai and farther east is extremely important. It once again demonstrates a phenomenon of deliberate selection of motifs and artistic traits by steppe populations which were possibly intended to match those of Persian monarchy, but without any radical transformation of their local society, beliefs and customs, and certainly far removed from any servile social and artistic imitation.

Moreover, we know that the peoples of the steppe, especially in the Altai region, were not the only intermediaries and partners of the Persian empire and Greek world. The cultural flow was multi-directional and steppe elements entered the arts of these empires too. The Oxus Treasure contains steppe as well as local and Achaemenid 'Court Style' objects,[121] and other steppe elements are found in Achaemenid and Hellenistic

[114] Wang ed. 2014: 92 (M3), 97 (M14: 62, M14: 55.4), 104 (M14: 65); Yang, Jianhua and Linduff 2013.
[115] See Wang, this volume.
[116] Cambon and Jarrige eds 2006: 156, 266–67, cat. 23.
[117] Herodotus, *The Histories* 4.71, quoted in full by Barfield, this volume.
[118] On royal Achaemenid crenellated crowns: Schlumberger 1971; Henkelman 1996; Pfrommer 1996.
[119] Wang 2011; Yang, Jianhua and Linduff 2013; Wu 2013: fig. 4 (chariots M16-2, M3-4); Gansu Sheng Wenwu Kaogu Yanjiusuo (ed.) 2014: 24, fig. 14 with reconstruction of chariot from M3-1 (type A).
[120] Pfrommer 1998.
[121] E.g., Kuzmina 1977; Dalton 1964: xliii, written in 1905: 'The Persian objects in the Oxus treasure are under the immediate influence of this imperial system'.

art of Bactria: a cylinder seal found at Ai Khanum is engraved with a rampant tiger in steppe style and a number of seals and even coins from this region bear curling felines, another typical motif of steppe art.[122] We also know that in the Oxus valley, not far from Ai Khanum and close to the 19th century findspot of the Oxus Treasure at Takht-i Kuwad, a bone scabbard for an *akinakes* was excavated at the post-Achaemenid site of Takht-i Sangin and depicts a lion with head *en face* and body in profile attacking a spotted deer, a kind of 'Bactrianised' Achaemenid composition. There the lion's head looks as if it has been cut and pasted from a Persepolis stone relief, or extracted from a feline face roundel of the type described above (Figure 28).[123]

The new chronological classification of kurgans now raises the possibility of direct post-Alexandrian Greek influence, either via Bactria or across the steppe, during the late 4th or early 3rd centuries BC thus post-dating and unmediated by the Persian empire. Here we should note that Achaemenid imported, inspired or similar artefacts generally only appear with elite burials, apart from a single cloth ornament found in the small kurgan 22 of Justyd XII.[124] They feature on items of dress, artefacts and furniture, as well as the tack of some of horses placed in the burial pits adjacent to the funerary chambers. Most Achaemenid artistic elements found in the Altai only arrived after a process of selection of themes, motifs or stylistic elements which find their source in the function of the objects: borrowed from monumental art and the portable material culture of the Achaemenid Court, the themes and motifs were translated to horse trappings and personal ornaments and integrated into the mobile lifestyle of the nomad. This was done within the constraints of the available materials and techniques (metal, wood, gold, tin by cutting, casting, hammering, etc.), and in accordance with the meaning of the images, whether ornamental or mythological. Achaemenid elements were systematically re-worked according to local stylistic requirements and taste but following pre-existing native steppe art traditions. We should never under-estimate the importance of Achaemenid art on the steppe: it appears there at the end of the 4th century BC and survived there as late as the mid-3rd century BC, but in earlier periods – as we have seen from the Arzhan-2 (*c.* 600 BC) and Tuekta 1 (*c.* 440 BC) – Achaemenid and Near Eastern arts in general were almost totally absent from central Asia.

Beyond the Altai on the wide Eurasian steppe, during the same period as well as later, other important kurgans provide additional material for reconstructing the network of connections along what we may call

Figure 28. Lion attacking a deer on a bone scabbard for a short sword from Takht-i Sangin, Tajikistan (Dushanbe Archaeological Museum; after Schiltz 1994: fig. 229)

the 'steppe road' and this evidence is briefly reviewed below. Some of the most important finds in this context come from the southern Urals.[125] The kurgan cemetery at Filippovka has yielded a number of imports, imitations and inspired objects, as well as evidence for a distinctive new and local expression of steppe art. Among the former we can list a torc, amphora and gold amphora copy, a pendant with inlays and a lunar bust, a bracelet with mouflon *protome*, and a cup, rhyton and silver cover of a throne foot with complex Achaemenid profile.[126] Moving to southeast Kazakhstan, the cemetery at Issyk in Semirechye includes the findspot of the so-called 'golden man', and the deceased was buried with silverware of Achaemenid affinities: a basin,

[122] Francfort 2007; 2013.
[123] Schiltz 1994: 307, fig. 229.
[124] Kubarev 1991.
[125] In general, see: Treister and Yablonsky eds 2012.
[126] Anikeeva, Shemakhanskaya and Yablonsky 2017; Aruz *et al.* eds 2000; Balakhvantsev and Yablonsky 2007; Yablonsky and Meshcheryakov 2007; Treister 2010*a*; Treister and Yablonsky eds 2012; Yablonsky 2015; Yablonsky and Treister 2019 with more detailed studies on the Achaemenid-related material from Filippovka-I.

an inscribed cup, a spoon with a handle terminating in a reversed duck's head, and a gold ring (a typical Greek/Greco-Persian object but with an odd engraving of a head in profile wearing a feathered headdress).[127] Taksai-1 is in a similar situation, revealing links with the Achaemenid empire with some artifacts such as the comb depicting an Achaemenid charioteer defeating Scythians.[128] Lebedevka, also in the Urals, provides an Achaemenid silver rhyton, a Greco-Roman basin and a jug.[129] Isakovka and Prokhorovka contain an Achaemenid *phiale* reused as a *phalera* (horse ornament), and Hellenistic cups inscribed in Chorasmian and Parthian using the Aramaic alphabet.[130] Sidorovka has to be mentioned in this context as it yielded a silver *phalera* depicting elongated curved tiger-griffins with scalloped mane similar to one in the Hermitage thought in the past to be Graeco-Bactrian,[131] and finally Volodarka produced a pair of *phalerae* depicting Bellerophon mounted on a winged Pegasus fighting the Chimera: this composition is close to the *emblema* of a 4th century BC mosaic at Olynthus in Macedonia.[132] This small list is neither complete nor exhaustive, but demonstrates how finds from the 'steppe road' illustrate the level of exchange and penetration of Achaemenid and Greek arts into Eurasia, even if the precise date and place of manufacture of some of the imported and reused artefacts is not always easy to establish, and the same applies to the date of deposition within some of these burials.

Relations between the Pazyryk culture and contemporary China have been the subject of numerous studies since the time of Salmony[133] and Jettmar.[134] However, this subject has received a new injection of interest following new finds from northwest China. The feline head with a curling motif in the ears, combined with other motifs in the lower register, is common in Altai art and finds close parallels in a number of bronzes from northwest China, inner Mongolia and Ordos in what may be termed Sino-Siberian art. However, chronological problems remain and those from Altai may be earlier, since this motif appears as early as the Tuekta-1 kurgan which date to *c.* 400–440 B.C., thus earlier than those from Pazyryk. Similarly, the 'cloud motif' which is present on some of the Pazyryk and Berel'11 horse trappings are now also paralleled from China, in Sino-Siberian art and in the Ordos. However, yet again, the abundant presence of the 'clouds' at Tuekta-1 opens the possibility of antecedents in the Altai and transmission to China, or perhaps of stronger links with China. Scholars such as M.I. Artamonov[135] and E. Jacobson[136] have observed several other instances of Achaemenid influence on the art of the Zhou and 'Warring States' period, and conversely, for instance, beside the 'cloud motif', the schematisation of mountains. Another motif, that of the elk head with lobed antlers and leaf-shaped ears, which is stylised at Berel' and present at Pazyryk, also finds antecedents at Tuekta-1 but there again the bronzes of northwest China retain this motif in some scenes where an elk is attacked and devoured by a tiger, especially at Chenyangchuan in Ningxia (Figure 30).[137] The monster retains the S-shaped ornamental motifs, the eagle heads are attached to its body as in Pazyryk art and, even more strikingly, the segmented scorpion tail in our case derived from Achaemenid originals (even if antecedents are known in Ancient Near Eastern arts) is also present and carefully rendered. Here the carved decoration of the Bashadar coffin come to mind, with its representation of tigers, but also gold belt plaques from Majiayuan where the large feline is identified as a lion.[138] A plaque from Chenyangchuan depicts rapacious birds' heads above a curling feline, a variant contrary to the formula which represented heads of felines placed above those of eagles. Again at Chenyangchuan, the three petals palmette between a pair of raptors' heads provides another link with Altai and Achaemenid art (Figure 11).[139] We might add here that the elk is an ancient local motif in the art of central Asia: its image travelled far from its natural habitat, both to the west, for instance down to the kurgan of Issyk, and apparently also to Ningxia or Mongolia where it occurs on bronze plaques where it is attacked and devoured by tigers. In some burials in the cemeteries of Chenyangchuang and Xinzhuangtou there are other sets of artefacts and objects which attest to relations with the west, the Alay, and westwards to the Achaemenid empire.[140]

However, the parallels with northwest China and nomadic art are not limited to burials from the Altai region.[141] The Alagou (Tianshan, Xinjiang) gold foil decoration displays the stylistic principles of Altai art with monsters with reversed hindquarters and the curling motif in their ears; from Alagou there is also a fragmentary silk imported from the kingdom of Chu which is embroidered with the same phoenixes as the silk piece from Pazyryk 5.[142] At Jiaohe Goubei,

[127] Akishev 1978; see also Simpson and Pankova eds 2017: 302, cats 216–17 (National Museum of the Republic of Kazakhstan, inv. nr. TK1-1844, 1845).
[128] Lukpanova 2015; also Lukpanova, Satubaldin *et al.*, Summerer and Lukpanova, this volume.
[129] Moshkova and Treister 2014; Stöllner and Samashev eds 2013.
[130] Treister 2009*a*; 2009*b*; 2010*a*; Koryakova 2000; Livshits 2003.
[131] Koryakova 2000; Koryakova and Epimakhov 2007: 307, pl. 8.2; Erdy 2003/04: fig. 7.
[132] Gutsalov 2012; Mordvintseva 1999; Treister 2012.
[133] Salmony 1933.
[134] Jettmar 1965; see also Bunker 1991; 1993; Bunker *et al.* 1997; Linduff 2002a; 2006; Linduff and Mei 2009; 2014; So and Bunker 1995.
[135] Artamonov 1973.
[136] Jacobson 1985; 1988.
[137] Yan and Li 1992: 46, fig. A45.
[138] Wu 2013: fig. 6g.
[139] Bunker *et al.* 1997.
[140] Wu 2013.
[141] Francfort 2009.
[142] Debaine-Francfort 1990; Polosmak 1998*a*; Wang 1987.

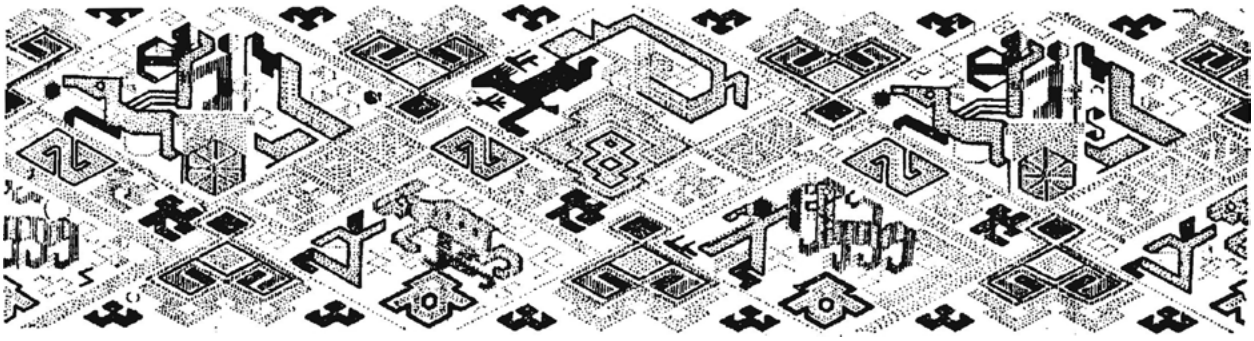

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Figure 29. Mashan, silk, image of chariot and hunt: 1, view from above; 2, profile (after Jingzhou Museum 1985, 'Chou Tomb I at Mashan. in Jiangling', Cultural Relics Publishing House, Beijing: 48–49)

near Turfan in Xinjiang, an elite burial surrounded by horse burials revealed important links with the art of the Altai:[143] a gold diadem or torc with saiga antelope head terminals is a theme which finds parallels in Ukok, Tuva and elsewhere, and a bronze mirror is decorated with the 'cloud' motif. However, the most remarkable object is a gold foil composition where a tiger is attacked by an eagle griffin whose body is covered with scale-like feathers. A well-known Tuekta-1 frontal exhibits a griffin with scaled feathers.[144] Two openwork plaques in gold, allegedly from Siberia, depict bird of prey heads with the same scaly attributes.[145]

Another aspect of this artistic network between China and Persia appears at Pazyryk 5. In addition to the well-known bronze mirror and the Chou silk with phoenix birds mentioned above, another Chinese silk piece decorated with geometric designs has been identified as coming from workshops in Mashan.[146] However, from that site some other decorated silks are especially important: some represent chariot designs where the chariot and the driver are seen from above or frontally, in the tradition of the steppe Andronovo art and Shang chariot representations of the Bronze Age – this is also the tradition of representation of the Nanshangen bone plaque (Mongolia) of the Western Zhou period.[147] Other silks from Mashan depict chariots in profile, as we have seen earlier, and following the ancient Near Eastern tradition (Figure 29, 1–2). Most interesting is one which depicts a hunting scene where the chariot cab contains a driver and an archer shooting large feline predators. This is precisely the scheme of the 'royal hunt' of Achaemenid iconography, as represented in miniature on the 'Darius cylinder seal' found in Egypt, but depicting a scene derived from that of Assyria (despite the updated details which represent an Achaemenid rather than Assyrian chariot and the palm trees indicating an Egyptian or Babylonian landscape).[148] Here the influence of Persian art, although transformed, is especially clear. The main point is that the old Bronze Age Sino-steppe manner of depicting a chariot, draught animals and driver in aerial view co-existed with the new style of profile view originating from the Achaemenid world, but after the Shang period the aerial view, analogous with the steppe Andronovo chariot designs on petroglyphs and pottery and again derived from the old Eurasian 'split representation', and after a period of co-existence of both forms of representation, the ancient Near Eastern 'western' profile view was finally adopted in China.[149] Similarly, it is possible that the addition of wings on beings and animals in Chinese art occurred, along with other iconic traits such as reversed hindquarters, under 'Western', Near Eastern or Achaemenid influence.[150]

At this point we should also draw attention to an exceptional bronze statue from Xinyuan in northern Xinjiang which provides the best example of an early

[143] Xinjiang Wenwu Kaogu Yanjiusuo 2001.
[144] Rudenko 1960: pl. LI.1–2.
[145] Coll. Barbier-Mueller: Barbier 1996: 22, 39, figs 26, 27, no. 12; analogy in Pang ed. 1998: 70, no. 64.
[146] Bunker 1991.
[147] Francfort 2002.
[148] Merrillees 2005: 52–53, cat. 16, pl. VII.
[149] Francfort 2002; Thote 1999.
[150] Francfort 2016; Pirazzoli-t'Serstevens 1994; 2007.

Figure 30. Feline attacking a herbivore: bronze, Chenyangchuan, Ningxia, PRC (after Bunker, Kawami, Linduff and Wu 1997: fig. A44)

Figure 31. Greek hoplite statuette, Gongnaisi, Xinjiang, Urumqi Museum, PRC (after Zongguo Lishi Bowuguan and Xinjiang Weiwu'er Zuzhiqu Wenwuju 2002: 28–29)

presence of Greek art in China (Figure 31).[151] Measuring as much as 42 cm high, it represents a kneeling Greek hoplite dressed in a skirt, wearing a high crested Phrygian helmet (not a Scythian hood, as seen from the back) with cheek pieces (*paragnathides*), and originally holding an item (now missing) in his hands.[152] It is dated to the 4th century BC and was found with the large bronze circle with horned lions mentioned above although it is unclear where it was cast. All these finds demonstrate the growing importance and complexity of the cultural exchanges which ran alongside commerce and political relations.

The growing importance of Greek art in the Eurasian steppe, and as far as Mongolia and China, is demonstrated by many other finds from the first centuries of our era, but these lie beyond the scope of this paper. However, we should highlight those made in the Tillya Tepe burials, the extraordinary textiles from Noin Ula, the Khalchayan royal sculptures, and the Miran Buddhist paintings. Greek power disappeared from Bactria around 130 BC following the incursions of the Saka, Yuezhi, Wusun and Xiongnu in the steppes and the installation of the Kushan dynasty but Classical influence and Greco-Roman imports did not stop, as is demonstrated by discoveries made in the cemetery of Sampula (Xinjiang) and other sites such as Niya. This is the period of the so-called 'Silk Road' which re-ignited Classical influence in western China and brought new ideas, goods and people to all of the areas intervening but the period of the Pazyryk culture was over and that of the Kushans, Sasanians, Xiongu, Chionites, Hephthalites and Huns is another story.

Conclusions

In this paper, we have stressed the role of the sedentary civilisations and the dynamic creativity and inter-relationship between the early nomads of the Altai and their close neighbours on the Eurasian steppe. We can tentatively place these developments within an ecological, anthropological, cultural and historical perspective. Some themes, motifs and stylistic conventions have their source in a local, ancient and continuous steppe tradition represented in the early kurgans of the Altai and neighbouring regions, especially present-day eastern Kazakhstan and Tuva. However, other themes and motifs barely belong to a steppe tradition but are influenced and modified by Achaemenid and ancient Greek art and are present at Pazyryk, Ukok and Berel'; others present in the art of the Altai, or typical of this tradition, were transmitted to Xinjiang, Gansu and Ningxia in northwest China. Later, the steppe tradition as well as the Near Eastern themes and motifs re-configured by steppe art were re-introduced to Bactria and the Near East after nomadic

[151] We do not consider here the Xian funerary arts question in relation with Greeks discussed by Nickel (2006; 2013; 2015).

[152] Wang 1987; Debaine-Francfort 1990; Boardman 1994: 149–50, fig. 4.96.

migrations of the 2nd century BC to 1st century AD, in the former case after the Saka-Yuezhi migration, in the second after Parthian conquest of Iran and Mesopotamia. In both cases, the old autonomous steppe tradition was strong and represents the vast majority of all finds and across all media from the Eurasian steppe, whereas those objects inspired by the world of the agrarian empires are strictly in the minority. Recent excavations and scientific analyses provide a better chronological classification of these finds, in turn enabling a more precise analysis of their stylistic trends and context and how Near Eastern themes and motifs were re-imagined within the completely different world of the Eurasian steppe. The means by which this process occurred may be reconstructed as follows:

- knowledge of Achaemenid art (whether monumental or portable), by exchange, cooperation, trade, war, migration and marriage;
- selection of some motifs, themes or compositions according to tastes and principles of which we remain ignorant;
- deconstruction of the originals in separate elements through a different vision of the forms;
- recomposition within a pre-existing 'Scythian' context of steppe nomadic equestrian steppe societies, with steppe artistic intentions and old indigenous steppe traditional morphologic and stylistic conventions;
- transmission further east across the Eurasian steppe towards China through the same means as step 1 above;
- interactions in Bactria, Parthia, Sogdiana and Chorasmia (in the agricultural world) and everywhere across the steppe;
- expansion, acceleration and expanding Hellenisation at the end of the 1st century BC and beginning of the 1st century AD.

The historical and social context are more difficult to ascertain since the historical written sources are not abundant and are mostly concerned with war, migration and conquest, which hardly covers the history of relations between steppe and empires, and in any case they are not always very clear. There is much discussion about the open environment of the Eurasian steppe and the possibility it created for easy movement following the development of horse-riding but this paper has attempted to explore the socio-cultural effects of artistic transfers, how closely these can be dated and the local transformation of imported motifs. The ideological context and a better understanding of the rules and principles explaining the system of transfer and transformation observed here demand reflections in art theory and the philosophy of art which lie beyond the scope of this paper but have very wide ramifications for the understanding of relationships between completely different societies in vastly different eco-zones.

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Textiles, dyes and pigments of the European Scythians: preliminary analyses of materials from southern Ukraine

Margarita Gleba,[1] Ina Vanden Berghe,[2] Marina Daragan[3]

Abstract

Leather, felt and textiles which have survived in Scythian burials from southern Ukraine provide a rich source of information about the materials and techniques used by the Scythians for the construction of their clothing and other practical objects. Furthermore, traces of pigment indicate that these items were colourful, providing information that cannot be gained from representational artwork. This paper presents preliminary results of the analysis of a selection of textile and leather fragments preserved in Scythian burials across southern Ukraine. The results are placed in the wider context of European and Eurasian textile and dye cultures of the 1st millennium BC.

Keywords: European Scythians, textiles, dyes, pigments, madder, cinnabar, SEM, HPLC

Introduction

Textiles and skins were the primary materials for Scythian clothing and various objects of personal use, such as bags, quivers, horse harnesses etc. Textile and leather artefacts provide a wealth of information about the raw materials, colours and techniques used to create these objects. Recent investigations of finds from frozen burials of Altai demonstrate the diversity of materials used for making and decorating garments and other objects by the nomadic populations of ancient Siberia.[4] In the Asian zone of Scythian expansion, permafrost preserved large quantities of organic materials that have been practically unaltered since the day they were buried. However, much less is known about the organic components of nomadic clothing from other regions, including European Scythians due to the poor preservation of organic material in these other areas. Fragments of textiles and leather objects have been recovered from numerous burials in Ukraine but few of these have been analysed scientifically.[5] Many are mineralised on metal objects and have lost their original colours.[6] This preliminary study analyses a selection of textile and leather fragments from Scythian burials across southern Ukraine to determine the level of fibre, dye and pigment preservation. The first results of this investigation provide information pertaining to the raw materials of the leather objects and textiles, as well as information concerning the pigments and dyes used to decorate them, thanks to traces of colour that are still visible on some of the artefacts.

The materials analysed come from nine burials, several of which contained both preserved textiles and leather objects. The contextual data are summarised in Table 1 below.

Textiles

The textiles analysed for this study come from nine burials, all dating to the 4th century BC (Figures 1–2). The technical characteristics of these items are summarised in Table 2. One of the textiles from Bulgakovo may be sprang but the preservation is extremely poor and further analysis is necessary. The braided structure identified on the Krasnyi Perekop textile was likely part of a finishing border. The majority of the weaves are tabbies or weft-faced tabbies, where warp and weft threads alternate one over and one under. The number of weft threads in weft-faced tabbies is higher per unit of length, creating a denser weave, often with weft threads completely covering the warp. Weft-faced tabby is a common weave among the published examples of contemporary textiles found in Ukraine,[7] also among the textiles from Arzhan-1[8] and other Altai burials.[9] No twills have been identified among the analysed material, although twills have been found in other Ukrainian Scythian burials, such as Chertomlyk,[10]

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[4] Polosmak and Barkova eds 2005.
[5] Gleba and Krupa 2012.
[6] On mineralization, see n. 22.
[7] Gleba and Krupa 2012: 405–13. None are as fine as some of the weft-faced tabbies found in Greek burials in Crimea, for example the weft-faced tabby from a burial at Nymphaeum, which have 14/60-70 threads per cm (Wild 1977).
[8] Marsadolov *et al.* 2017; Pankova *et al.*, this volume.
[9] Glushkova 2005: 189.
[10] Rolle, Murzin and Alekseev 1998: 23, cat. 127.

Site	Burial type	Age and gender	Burial inventory	Date	Reference
Ilyinka, kurgan 4, burial 3	Secondary burial: burial chamber of catacomb type	Child	Two quivers containing arrows with textiles beneath; iron knives; beads; thin wooden elements, possibly from a bow	Second to early third quarter of the 4th century BC	Pleshivenko 1991*a*
Bulgakovo, kurgan 5, burial 2	Secondary burial: burial chamber of catacomb type	Double, probably adult male and female*	Wooden boxes; spindles; pottery; Greek pottery; bronze cauldron; iron knives and spears; beads; earrings; torc; rings; leather quiver containing arrows with textiles beneath	Second quarter of the 4th century BC	Grebbenikov 2008: 83
Vodoslavka, kurgan 8, burial 4	Secondary burial: burial chamber of catacomb type	Sub-adult, probably male*	Quiver containing arrows with textiles beneath; bow; bronze finial; iron knives; wooden plate	Beginning of the third quarter of the 4th century BC	Kubishev *et al.* 1983: 80–81
Vodoslavka kurgan 8 burial 1	Principal burial: burial chamber of catacomb type (looted)	Not sexed, possibly adult male	Bone pendant; gold pendant; sacrificial food; *kantharos*; fragments of a wooden pole with bronze sheathing and leather thong; quiver containing arrows with bronze arrow heads; iron belt; spears; leather fragments; bronze cruciform ornament; textiles	Beginning of the third quarter of the 4th century BC	Kubishev *et al.* 1983: 74–76
Novaya Kamenka, kurgan 10 burial 2	Secondary burial: burial chamber of catacomb type	Two adult females: principal burial contained 20 year old accompanied by an older individual buried at her feet	Two silver head rings; silver torc; bronze mirror with textile remains (beneath left shoulder); beads; wooden box; needle; pigment pieces; spindle whorl; finger ring; amphora; wooden tray with sacrificial meat remains	End of the second quarter of the 4th century BC	Kubishev *et al.* 1984: 69–70; Polin 2014: 361
Krasnyi Perekop 4, kurgan 22 burial 1	Secondary burial: burial chamber of catacomb type	Adult female	Bronze mirror with iron handle and textile remains; golden fittings of a mirror case; golden elements of headdress; earrings; applique; black-figure bowl; two bronze spindle whorls; wooden trays with sacrificial food remains; iron knives with bone handles; bronze plate; glass beads	Second to third quarter of the 4th century BC	Leskov *et al.* 1970
Brilevka kurgan 12 b2	Secondary burial: burial chamber of catacomb type	Adult female	Animal bones (food); knife; two pottery vessels; iron ring; white pigment; necklace beads; lead spindle whorl; bronze arrow heads; bronze mirror with textile remains (beneath left shoulder)	End of the 5th century BC	Yevdokimov, Gershkovich and Porutsky 1985: 20
L'vovo II kurgan 3 b1	Secondary burial: burial chamber of catacomb type	Adolescent female 10 to 12 years old	*Kantharos*; lead spindle whorl; amphora fragment; earring; necklace beads; bronze mirror with textile remains (under left shoulder), bead bracelets, silver finger ring	Second to third quarter of the 4th century BC	Yevdokimov *et al.* 1983: 16–17
Yefremovka kurgan 1 b1	Principal burial: burial chamber of catacomb type (looted)	Double, probably adult male and female* or two females	Two bronze mirrors (one with textile remains); black-figure *kantharos*; fired clay spindle whorl; fragments of bronze head rings; flint flake; cowrie shell; bronze arrow head	Second quarter of the 4th century BC	Kubishev, Dorofeyev and Nechitailo 1984; Polin 2014: 401

Table 1. Summary of burials which yielded materials analysed in this study
[*without osteological determination of gender]

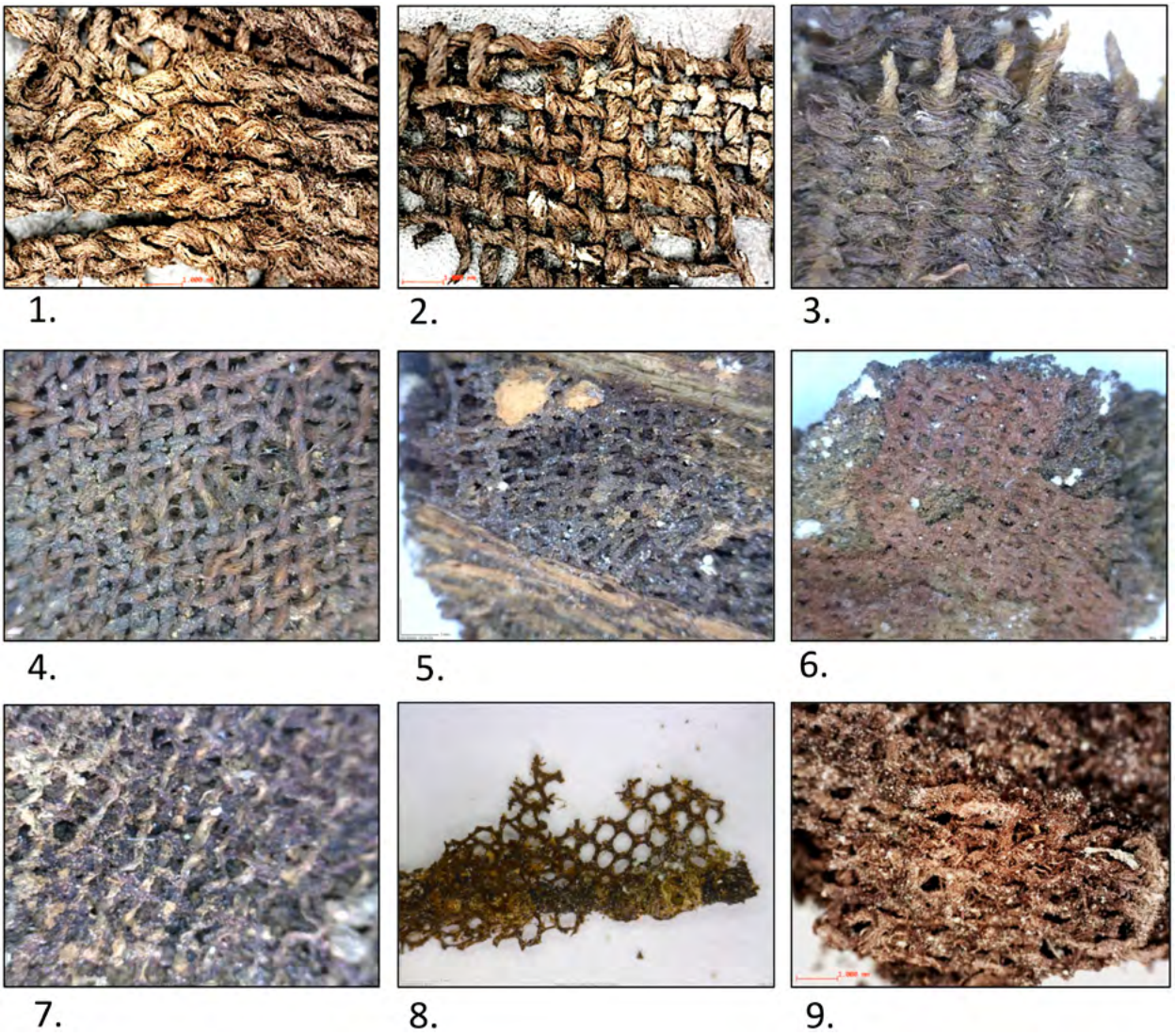

Figure 1. Micrographs of textile samples nos 1–9 (images: M. Gleba)

Blitznitsa-2[11] and Velykyi Ryzhanivs'kyi kurgan,[12] all dated to the 4th century BC. Twills are also present at the earlier Altai sites of Arzhan-1,[13] Ak-Alakha-1, Ak-Alakha-3, Ak-Alakha-5 and Verkh-Kal'dzhin-2.[14] It should be noted that no twills have been identified from Greece or the Near East from pre-Roman times yet they are very common in Italy, central and western Europe beginning in the Late Bronze and throughout the 1st millennium BC.[15]

Despite the highly degraded state of most of the fibres, scanning electron microscopic (SEM) analysis permitted the identification of two types of fibres: animal (sheep wool) in four examples and plant bast (likely flax) in one. Both of these materials were common over a large geographical area of Europe and Asia. The preservation of these artefacts was not sufficient to carry out wool quality analysis.

All of the textiles have z- or clockwise-twisted yarn with the exception of the plant fibre textile from L'vovo, which was woven with s- or counter-clockwise-twisted yarn. Z- or clockwise-twisted yarn is typical of the European textile tradition, and also appears to be the preferred twist direction among extant Scythian textiles found across Ukraine.[16] All the textiles from Arzhan-1 were woven with z-twisted yarn which in some cases was S2-plied,[17] as were all of the textiles from the Ukok Plateau.[18]

Weft-faced tabbies usually have a tighter spun warp and looser spun weft, and in two examples the twist direction of the weft is almost imperceptible. This is typical for wool weft-faced tabbies from Mediterranean

[11] Romashko and Skory 2009.
[12] Skory *et al.* 1999; Babenko, Bredis and Klochko 2001; Bredis 2001.
[13] Marsadolov *et al.* 2017; Pankova *et al.* this volume.
[14] Glushkova 2005: 179–80, 189.
[15] Gleba 2017.
[16] Gleba and Krupa 2012.
[17] Marsadolov *et al.* 2017; Pankova *et al.*, this volume.
[18] Glushkova 2005: 177, 188.

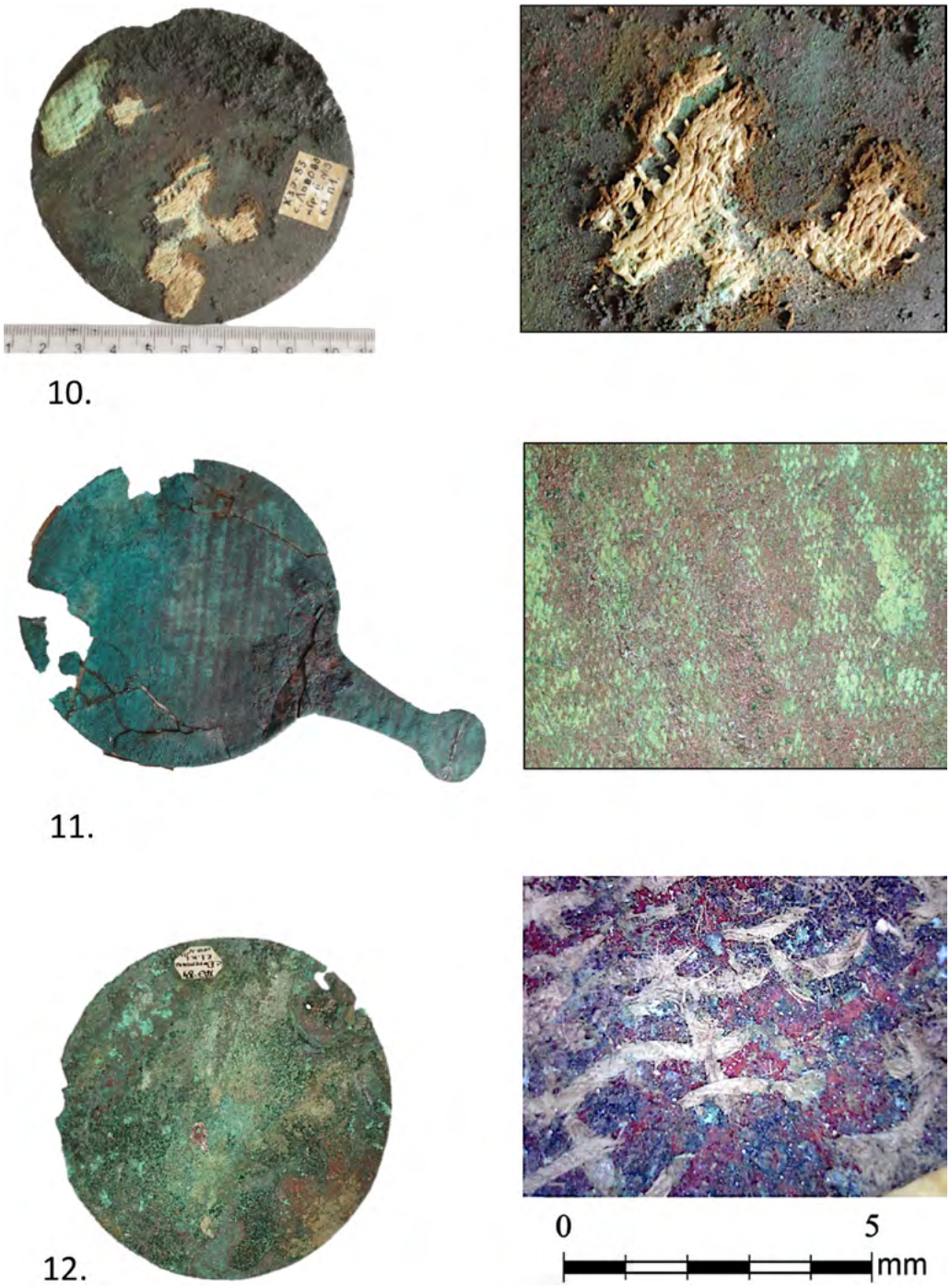

Figure 2. Objects and micrographs of textile samples nos 10–12 (images: M. Daragan)

Europe (particularly Greece) and the Near East.[19] The low twist allows for beating the weft threads closer together resulting in a denser weave.

Two burials (Novaya Kamenka and Bulgakovo) contained felt fragments. Felt is common among the archaeological assemblages of Altai burials and continues to be the preferred material of Eurasian nomads in modern times.[20]

The function of the textiles is not always easy to reconstruct given their highly advanced state of degradation, and most existing interpretations necessarily rely on their context and position within the burial. Burial 2 in kurgan 5 at Bulgakovo yielded two types of fabric and the remains of felt, which were found under the quiver. The cloth remains were arranged in multiple layers, suggesting that the fabrics were folded before being deposited in the burial. Textile remains from burial 1 in kurgan 8 at Vodoslavka were at least 20 layers thick when encountered in the corner of the burial chamber. This layering, likely the result

[19] Gleba 2017.
[20] Polosmak and Barkova eds 2005: 80, 92, 109–137, 143.

No.	Site	Location in burial	Weave	Fibre	Thread count per cm in warp/weft	Thread twist in warp/weft	Thread diameter in warp/weft (mm)
1	Krasnyi Perekop 4 kurgan 22 burial 1	on bronze mirror	Braid	wool	–	4z	0.3-0.5
2	Krasnyi Perekop 4 kurgan 22 burial 1	on bronze mirror	tabby	wool	6/6	z/z	0.3-0.5/0.3-0.5
3	Novaya Kamenka kurgan 10 burial 2	on bronze mirror	weft-faced tabby	–	8/14-15	z/i	0.5-0.6/0.4-0.6
4	Novaya Kamenka kurgan 10 burial 2	on bronze mirror	tabby	–	16/16	z/z	0.4/0.4
5	Vodoslavka kurgan 8 burial 4	beneath quiver	tabby?	–	20/25	z/z	0.2-0.3/0.2-0.3
6	Vodoslavka kurgan 8 burial 1	corner of the burial chamber	weft-faced tabby	–	10/30	z/z	0.3-0.4/0.3-0.4
7	Bulgakovo kurgan 5 burial 2	beneath quiver	tabby	–	20/30	z/z	0.2-0.3/0.2-0.3
8	Bulgakovo kurgan 5 burial 2	beneath quiver	sprang?	wool?	NA	z	0.1-0.2
9	Ilyinka kurgan 4 burial 3	beneath quiver	weft-faced tabby	wool?	10/40	z/i	0.2-0.3/0.2-0.3
10	Brilevka kurgan 12 burial 2	on bronze mirror	weft-faced tabby	NA	NA	NA	NA
11	L'vovo II kurgan 3 burial 1	on bronze mirror	weft-faced tabby	plant	6/12-14	s/s,S2z	0.4-0.7/0.3-0.5, 0.9-1
12	Yefremovka kurgan 1 burial 1	on bronze mirror	open tabby	NA	8/12	z/z	0.2-0.4/0.2-0.4

Table 2. Summary of textile analysis results [NA – Not Analysed]

of folding, as well as the position of textiles within the burial when recorded, suggests that these items were not garments that the deceased was wearing, but more likely that these textiles were burial furnishings or gifts. However, this is still a hypothesis to be investigated by further research.[21]

The majority of the analysed textiles were associated with bronze mirrors, which clearly facilitated the preservation of the textiles.[22] Burial 2 in kurgan 10 at Novaya Kamenka included a bronze mirror associated with a thick weft-faced tabby textile, a fine balanced tabby textile and felt. In the Krasnyi Perekop 4 kurgan 22 burial 1, a bronze mirror was found in association with two types of fabric and fur. Plant fibre textile remains were found mineralised on mirrors from burial 2 kurgan 12 at Brilevka, burial 1, kurgan 3 at L'vovo kurgan group II, and burial 1, kurgan 1 at Yefremovka (Figure 2). Mineralised remains of a tabby were found on a bronze mirror from Chertomlyk.[23] A mirror with probable remains of a tapestry weave depicting a bird was documented in burial 8, kurgan 4 at Mamai Gora.[24] It is notable that in all of the Ukrainian burials analysed here, the mirrors were found in association with female burials,[25] and were placed under the left shoulder of the deceased. Further research is needed to ascertain whether this configuration of grave goods was typical of the greater region. In the Altai burials, mirrors have been found in both female and male burials.[26]

Whether the textiles and furs associated with mirrors were used as containers or mirror covers is unclear because typically, the organic material only survives on one surface. This indicates that many of the textiles and furs of this analysis could have been the clothing of the

[21] The interment of large quantities of apparently folded textiles in high-status burials of a much earlier period in the Near East is attested by the finds of multiple cloth layers in a royal tomb at Qatna in Syria with a *terminus ante quem* of *c.* 1300 BC (James *et al.* 2009; Reifarth and Drevello 2011).

[22] In the presence of metal objects, textiles may become partially or completely mineralized (the latter are also known as pseudomorphs), a process during which metal corrosion products form casts of or around fibres retaining their external morphology and size almost unaltered (Jakes and Sibley 1984; Jakes and Howard 1986; Janaway 1987; Chen, Jakes and Foreman 1998). The conditions conducive to mineralization depend on pH value, oxidation potential and moisture, as well as the composition of the fibre, and on the elemental composition of the soil and metal (Janaway 1987: 136–42; Gillard *et al.* 1994). Iron and bronze in particular favour formation of easily legible traces. Most of the corrosion-preserved textiles come from inhumation graves. Even when minute, these traces can provide a considerable amount of information about ancient textiles.

[23] Rolle, Murzin and Alekseev 1998: cat. 94.

[24] Andrukh and Toshchev 1999: 33–34.

[25] Mirrors depicted in Scythian iconography are also associated with women (or goddesses), although Scythian depictions of women are quite rare; see Reeder ed. 1999: 146, 148.

[26] Simpson and Pankova eds 2017: 134.

Site	Sample	Fibre	Colour	Detected Dye Components	Dye Source(s)
Krasnyi Perekop 4 kurgan 22 burial 1	braid	wool	brown	isatin, indirubin	woad or indigo
Krasnyi Perekop 4 kurgan 22 burial 1	tabby	wool	brown	–	–
Novaya Kamenka kurgan 10 burial 2	weft-faced tabby warp		brown	alizarin (trace)	Madder
Novaya Kamenka kurgan 10 burial 2	weft-faced tabby weft		brown	–	–
Novaya Kamenka kurgan 10 burial 2	tabby		reddish brown	alizarin, purpurin	Madder
Novaya Kamenka kurgan 10 burial 2	Felt		brown	protocatechuic acid (trace)	Tannin
Vodoslavka kurgan 8 burial 4	tabby?		reddish brown	alizarin, purpurin, munjistin, rubiadin, nordamnacanthal, alizarin-like comp.	Madder
Vodoslavka kurgan 8 burial 1	weft-faced tabby		reddish brown	alizarin, purpurin, rubiadin, nordamnacanthal, alizarin-like comp.	Madder
Bulgakovo kurgan 5 burial 2	Felt		pinkish brown	alizarin, purpurin, alizarin-like comp.	Madder
Bulgakovo kurgan 5 burial 2	tabby?		black	alizarin, purpurin, rubiadin, nordamnacanthal, alizarin-like comp.	Madder
Ilyinka kurgan 4 burial 3	Tabby	wool?	reddish brown	alizarin, purpurin, alizarin-like comp.	Madder

Table 3. Summary of dye analysis results

deceased, which came into contact with the mirror due to their position in the burial. The organic materials were only preserved where they came into contact with bronze, which is known for its antimicrobial properties. Chernova and Busova also note that many textile and fur finds associated with mirrors from the Tuva region were likely outer garments.[27]

In instances of a single textile layer present on the mirror (particularly, mineralized plant fibre fabrics), the textile may have served as intentional cover. Mirrors similarly associated with textiles have been found in Egypt, Italy and Greece,[28] suggesting the existence of a wider phenomenon of mirror wrapping and its special significance in burial rituals. However, it is possible that the textiles simply functioned to preserve the fragile polished surface of the mirror.

Dyes

Not all of the textiles described above were analysed for dyes. For example, mineralized textiles were excluded as unlikely to yield any dye traces. Of the organically preserved textile fragments, 11 samples from six burials were analysed (in one case weft and warp were analysed separately). Where preservation allowed for identification, all of the analysed fabrics were comprised of sheep wool. The weaves are all tabbies, with one possible example of sprang.

The most effective method to identify dye components in highly degraded ancient textiles is high performance liquid chromatography (HPLC). Dye identification is based on the comparison of the absorbance spectra and retention times of the detected dye compounds with a reference spectra library. Prior to the chromatography analysis, the colourants are recovered from the fibre samples by acidic extraction.[29] Based on the dye compound identification, possible plant or animal sources can be suggested.

Eight of the 11 analysed samples tested positive for organic dyes and two groups of colourants were detected, indigoid and anthraquinone. A summary of these results is presented in Table 3.

The indigoid compounds isatin and indirubin were identified in a sample of a braid from burial 1 in kurgan 22 at Krasnyi Perekop 4. The indigoids are indicative of blue vat dyeing with plant material from woad, *Isatis tinctoria*. Woad is more common in Europe, although the use of Asian *Indigofera* or *Polygonum* species is possible because the chemical markers for both plant families are the same.[30]

A variety of anthraquinone compounds were identified in seven samples. The red anthraquinone compounds are indicative of a mordant dye process using roots

[27] Chernova and Busova 2016: 54.
[28] Price and Gleba 2012.
[29] A detailed description of the protocol can be found in Vanden Berghe, Gleba and Mannering 2009.
[30] Cardon 2007: 335–86.

of the *Rubiaceae* family.[31] Alizarin and purpurin were the major dye components detected by HPLC. Small amounts of rubiadin, munjistin, nordamnacanthal and another alizarin-like compound (the exact molecule is unknown) were also detected in some of the samples. The combination is characteristic of the use of the roots of the cultivated madder, *Rubia tinctorum* L.[32] Madder is native to the Middle East and the eastern parts of the Mediterranean.

The detection of a trace amount of protocatechuic acid in the brown felt from burial 2, kurgan 10 at Novaya Kamenka indicates the presence of a tannin (hydrolysable type). Moreover, all samples, except the one dyed with woad/indigo, show chromatographic characteristics suggesting the presence of condensed tannin. Further investigation is required to reveal whether tannins were applied to the textile during the dyeing process, for instance as a mordant, or were derived from the burial conditions *in casu* from the leather finds in the graves.

Indigoid and anthraquinone dye sources are among the earliest to be used for colouring textiles, so their presence within this sample is not surprising. They have been found in many European textile artefacts.[33] Among the Ukrainian Scythian finds, madder has been identified on textiles from the 7th century BC at Karavan kurgan in the Kharhiv region and from the 4th century BC kurgan at Besh-Oba in Crimea.[34] Both groups have been identified in previously analysed Scythian finds from the Altai. Indigoids were found at Arzhan-1[35] and as traces at Pazyryk-2, Pazyryk-5, Tuekta-2 and Ak-Alakha-3.[36] Alizarin and purpurin were found in various fabrics from Arzhan-1,[37] as well as at Pazyryk-2, Pazyryk-5, Tuekta-2, Bashadar-2, Ak-Alakha-1, Ak-Alakha-2, Ak-Alakha-3, Ak-Alakha-5, Katanda and Verkh-Kaldzhin-2.[38] Madder was used in combination with insect dyes on many of these fabrics.[39] The absence of insect dyes among samples of this study is surprising, given the prevalence of their use among the Siberian artefacts and considering the close geographical proximity of the southern Ukrainian sites to areas where kermes naturally occurs.[40] The reason may be the difference in status as none of the Ukrainian graves analysed here are particularly rich. Kermes has been identified in a later – Sarmatian – burial of a woman from Sokolova Mogila on the southern Bug river.[41]

Leather and skin finds

Leather items found in southern Ukrainian burials include numerous fragments of quivers as well as possible items of clothing and vessels.[42] In addition, SEM analysis of two fur fragments found in association with mirrors resulted in a preliminary identification of the *Mustelidae* and *Rodentia* families.[43] While leather samples come from domestic species, the garments and other utilitarian objects made of fur found in Ukraine and Siberia are mostly derived from wild animals such as hare, stout, sable, squirrel, weasel and jerboa, or horses.[44]

Pigments

Several leather quiver and wooden arrow shaft fragments from Ilyinka retained traces of bright red and blue colour (Figure 3). Three leather fragments and two arrow shaft fragments were sampled for analysis, with four retaining red and two retaining blue colour (one sample had both). SEM with energy dispersive X-ray detection (SEM-EDX – Zeiss EVO 150 with detector from Oxford Instruments) was used for the investigation of the elemental composition of substances present in the pigments. The summary of these results is presented in Table 4.

The blue pigment on the wooden arrow shaft from Ilyinka contains a high amount of copper, oxygen and phosphorus, together with calcium and chloride, while copper, silicon, carbon, oxygen and calcium were detected on the bluish particles preserved on the leather. Micro Raman Spectroscopy (MRS – Invia, Renishaw) with laser excitations of 785 nm in wavelength was applied to these two samples to detect the molecular characterization of organic and inorganic substances of the pigments. However, the Raman spectrum of the first sample does not match any known blue pigment in the Raman reference spectra database. No Raman spectrum could be obtained of the second sample due to high fluorescence. However, the latter is indicative of Egyptian blue, a synthetic pigment produced by fusing quartz, lime, alkali and copper-containing compounds in a furnace.[45] It was the most common blue pigment in the ancient world and its use has been amply demonstrated in painting and sculpture. It is also known from the Greek cities on the Black Sea coast,

[31] Cardon 2007: 107–66.
[32] Cardon 2007: 107–21.
[33] Cardon 2007.
[34] Krupa 2001.
[35] Marsadolov *et al.* 2017; Pankova *et al.*, this volume.
[36] Balakina *et al.* 2005: 195–97.
[37] Marsadolov *et al.* 2017; Pankova *et al.,* this volume.
[38] Balakina *et al.* 2005: 195–97.
[39] Balakina *et al.* 2005; Marsadalov *et al.* 2017; Pankova *et al.,* this volume.
[40] None of the dye sources identified in the Altai materials are considered to be local although only red and blue colourants were investigated: Kundo 2005: 211.
[41] Golikov and Ustinov 1986.
[42] Identification of the animal species used for the creation of these items is presented by Spindler *et al.* in this volume.
[43] ZooMS will be performed on these samples to independently confirm the identification.
[44] Polosmak and Barkova eds 2005: 43–61; Chernova and Busova 2016; Stepanova and Pankova 2017.
[45] Verri *et al.* 2010.

Ilyinka kurgan 4 burial 3, leather quiver 2 with paint
Ilyinka kurgan 4 burial 2, leather quiver 5 with paint
Ilyinka kurgan 4 burial 3, wood arrow shaft
Ilyinka kurgan 4 burial 3, leather quiver 2 with paint

Figure 3. Painted leather finds (left) with micrographs of samples (Images: M. Daragan and I. Vanden Berghe)

for instance Chersonesus.[46] However, its presence on a Scythian leather quiver is unusual and may suggest that it was obtained from a Greek settlement on the northern Black Sea coast, or that the quiver itself may have been produced by a Greek craftsman catering to Scythian consumers, as has been demonstrated for many toreutic items.

A stratigraphic study of the blue wood sample was carried out with SEM-EDX in order to distinguish the elemental composition of the blue layer and wood. Fourier-transform infrared spectrometry (FTIR) analysis of the blue layer made it possible to identify the blue pigment as copper phosphate. Copper phosphate has a blue to bluish green colour. It occurs naturally in some minerals (like pseudomalachite), but it can also

[46] Twilley 2002.

Site	Object	Colour	Elements – EDX spectra	Pigment
Ilyinka kurgan 4 burial 3	leather quiver 2 with paint	red	Hg, S, (Cu)	Cinnabar
Ilyinka kurgan 4 burial 2	leather quiver 5 with paint	red	Hg, S, (Cu, Fe)	Cinnabar
Ilyinka kurgan 4 burial 3	wood arrow shaft	blue	O, Cu, P, Cl, Ca, C, (S)	copper oxide
Ilyinka kurgan 4 burial 3	wood arrow shaft	red	Hg, S	Cinnabar
Ilyinka kurgan 4 burial 3	leather quiver fragments with paint traces	red	Hg, S	Cinnabar
Ilyinka kurgan 4 burial 3	leather quiver fragments with paint traces	blue	C, O, Si, Cu, Ca, Al, Mg, P, S	calcium copper silicate?

Table 4. Summary of pigment analysis results

be found on bronze and copper objects exposed to phosphate, such as in burial environments, due to the nearby decomposition of bone or horn. Whether the copper phosphate identified in this sample indicates a transformation/degradation post burial or an original, intentionally used material cannot be concluded by this analysis.

The red pigment in all four red samples was identified as cinnabar (HgS). Cinnabar is a naturally occurring mercury sulphide and has been utilized for decorative purposes for millennia, with one of the earliest instances of its use documented at Çatalhöyük in Turkey and where it was used on wall paintings and in burial contexts from Level VIII and dating approximately from 6700 cal. BC.[47] In Europe, cinnabar exploitation and use as a pigment started by at least the late 6th millennium BC in the Almadén district in Spain, from where the pigment was subsequently distributed through long distance exchange networks during the Neolithic and Chalcolithic periods.[48] Cinnabar documented on the pottery of the Vinča Culture has been traced to the Šuplja Stena mine, located close to the site of Vinča near Belgrade in Serbia, where it has been mined at least since the 6th millennium BC.[49] Cinnabar has been identified in Etruscan tomb paintings, the painted wooden panels of Tatarlı, the Archaic Pitsa plaques, on the marbles of Parthenon and mural paintings of the Late Classical and Hellenistic period at Vergina, Delos in Greece and numerous other sites.[50]

Although the Carpathian mountains and the Donbas regions of Ukraine have sources of cinnabar, neither location is believed to have been exploited during Scythian times and it must have been procured from somewhere further afield, perhaps the west where there are several known cinnabar mines in the Balkans, or from eastern source(s) in Turkey, central Asia or China.[51] Analysis of trace elements in the pigments of this sample and comparison with reference materials from various mines may produce information pertaining to possible sources. Classical authors praised cinnabar's value, brilliance and colour,[52] although they also noted its instability and sensitivity to light.[53] In Graeco-Roman contexts, the pigment was used primarily in paintings decorating important burials or in rich houses. It was frequently utilised in combination with other pigments, likely due to its expense and instability.[54]

The use of painted leather is not surprising, because depictions of ornaments on what could have been leather clothing and even quivers themselves are common in Scythian toreutic art.[55] Painted leather artefacts from Siberian graves indicate that this was common practice among the Eurasian nomads.[56] Cinnabar was also used to decorate the wooden and leather shield from Pazyryk burial mound 1 and table tops from burial mound 2 at Pazyryk.[57]

Painted arrow shafts are known from various Scythian burials, including examples preserved in a quiver from Bulgakovo.[58] The pigments have not yet been analysed but the red colour is clearly visible and the original excavation report also mentions the presence of white,

[47] Çamurcuoğlu 2015: 141; 2018.
[48] Hunt Ortiz *et al.* 2011.
[49] Gajić-Kvaščev *et al.* 2012.
[50] Brecoulaki 2014; Kakoulli 2009.
[51] Cinnabar has been identified on Achaemenid reliefs at Persepolis although the majority of the analysed red pigment samples were identified as hematite, the main constituent of a much more common mineral ochre: Stodulski, Farrell and Newman 1984. Hematite was widely used where large quantities of red pigment were required in architectural decoration: Ambers and Simpson 2005: 8–9.
[52] Pliny *Natural History* 33.117, 35.30; Dioscorides *De mat. med*. 5.94.
[53] Pliny *Natural History* 30.120-22; Vitruvius *De arch*. 7.9.2.
[54] Kakoulli 2009: 51.
[55] E.g., Reeder ed. 1999: 256–61; Simpson and Pankova eds 2017: 292.
[56] Simpson and Pankova eds 2017: 217.
[57] Simpson and Pankova eds 2017: 115. Madder could also be used for the purpose, as in the case of a wooden whip handle from Pazyryk-2: Simpson and Pankova eds 2017: 58–59.
[58] Daragan this volume.

black and blue paint.[59] Examples of painted arrow shafts have also been identified at Pazyryk mound 3 and other Altai burials.[60] Different colour patterns likely marked different arrow types. It is highly likely that arrows were produced by the Scythians themselves.

Other wooden objects could be painted as well. A top of the wooden box from Bulgakovo[61] and a drawing of the (unfortunately lost) sarcophagus from Maryinka Kurgan 8[62] are both clearly in Hellenic style and were likely produced by Hellenic craftspeople, perhaps even in the Pontic Greek centres: where and how the pigments for these objects were obtained is currently unknown but adds to the complexity of disentangling local Scythian and Greek traditions in this region.

Conclusions

This preliminary study of the materials involved in the production of European Scythian organic artefacts demonstrates that these types of archaeological finds hold great potential for adding important information about raw materials, technologies and the material culture of the European Scythians. Textiles demonstrate a variety of techniques and dyes (indigoid blue, anthraquinone reds and possibly tannins), although the range is more restricted than in the Altai finds. Leather items could be made from a variety of domesticated and wild animals and were painted with red cinnabar or blue pigments.

It is difficult to determine whether textile and leather items were produced by the Scythians themselves or exchanged with other populations. Apart from cinnabar, none of the materials need be imported. Burial 2 in kurgan 5 at Bulgakovo preserved the most complete leather quiver in southern Ukraine. Additionally, in association with the female burial, a textile tool set consisting of a box containing wooden weaving tablets, a spindle and three distaffs were identified in this deposit.[63] This indicates that Scythians valued textile production enough for the tools to accompany their owners into the afterlife. Mobility is not a hindrance to textile work and spinning with a drop-spindle is well-known from historic and ethnographic contexts to be done on the move.[64] Weaving can be accomplished on small ground or back-strap looms and these can be easily dismantled and carried. Present-day Mongolian and other Asian nomads practise textile production this way.[65] All of the plants that produced the dyes could be procured locally. Dyeing does not require permanent infrastructure and can be done in small cauldrons or pits dug in the ground; however, it can require extensive periods of time (e.g. for indigo vat fermentation), special climatic conditions and specialized skills and knowledge.[66]

Leather and skin production require an extended time period for its production due to tanning. The embossed designs used in the decoration on leather quiver fragments from Ilyinka have a distinctly Hellenic style. Indeed, the Scythians of southern Ukraine owned many materials obtained through exchange with the Pontic Greeks. Therefore, it is possible that some of the quivers, as has been argued for much of the toreutic art,[67] were produced in Greek settlements or at least by Greek craftspeople. The prevalence of sheep and goat skin as a raw material is not surprising, because these animals were the staple domestic species of the Scythians, and modern nomads are known to make skin and leather items themselves.[68]

The prevalence of reds among dyes and pigments undoubtedly is at least partially a culturally determined preference because the love for the colour red is well documented among many ancient cultures, and among the various Scythic populations this colour was associated with military aristocracy.[69] However, another factor could have been the better vitality of red dyes and pigments. For example, recent experiments on textile degradation have demonstrated that textiles dyed with madder tend to retain colour and survive better than non-dyed textiles or fabrics coloured with other dyes. This may be due to the chemical bonds between the anthraquinone dye molecules and the fibres.[70] The situation may be similar with pigments. For example, the excavation reports describing the Bulgakovo arrow shafts mention the presence of bright colours when the burial was first opened, such as red, white, blue and black[71] but now only the red is visible and all the other colours are no longer detectable with the naked eye. Cinnabar is known to be a particularly stable pigment, as proven by its survival for millennia at sites like Çatalhöyük.

These preliminary results of our investigation indicate that, despite poor preservation, the organic components of Scythian material culture can provide diverse and rich information about materials and techniques in use. Modern scientific methods enhance the array of investigative techniques available to retrieve even very fugitive traces of the past. It is our hope that further systematic investigations into the nature of textiles,

[59] Grebennikov 2008: 8.
[60] Simpson and Pankova eds 2017: 217, fig. 133, cat. 133.
[61] Daragan, Gleba and Buravchuk 2016.
[62] Bunyatyan and Fialko 2009: 63–65.
[63] Daragan, Gleba and Buravchuk 2016.
[64] Ahmed 2002.
[65] Ahmed 2002; Kristen Pearson, pers. comm. 2018.
[66] Polosmak and Barkova eds 2005: 166–68.
[67] Meyer 2013.
[68] Polosmak and Barkova eds 2005: 166.
[69] Yatsenko 2011.
[70] Ringgaard and Bruselius Scharff 2010.
[71] Grebennikov 2008: 84.

dyes, skins and pigments of the European Scythians will lead to a deeper understanding of the Scythian culture.

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Scythian gold from 19th century private collections in the Department of the Ancient World in the State Hermitage Museum

O. Gorskaya[1]

Abstract

The collection of ancient items of personal adornment from the northern Black Sea in the State Hermitage Museum can be divided into two: the larger proportion consist of objects with well-documented archaeological findspots but a small number include items purchased from collectors and dealers which lack any provenance. The latter are unpublished and have been unavailable to researchers. The Department of Classical Antiquities in the State Hermitage Museum has over 300 stamped gold plaques from private collections, mostly from the old collections of Lemmé and Mavrogordato. The aim of this research is to identify a group of plaques originating from Scythian and Sarmatian kurgans, for which I made a comparative analysis of the iconography of plaques from private collections compared with those excavated at Scythian and Sarmatian sites. It was found that several examples are paralleled only from single sites, hence are most likely to have been found at these very kurgans. I have identified gold plaques from several famous Scythian monuments, including the Kul-Oba, Chertomlyk, Great Bliznitsa and the 'Seven Brothers' kurgans. As a result of this, a quarter of previously undocumented plaques from private collections held in the State Hermitage Museum have now been dated more closely and re-attributed to known sites.

Keywords: Scythians; Greek and Roman jewellery; State Hermitage Museum; private collections; ancient art

Introduction

The collection of ancient items of personal adornment of the State Hermitage Museum is divided into two parts: most consist of items whose findspots are well-known and documented through archaeological excavation but a small proportion consists of items purchased from collectors or antiquities dealers at different times. In most cases it is impossible to know the findspots of the latter but, through careful research into their acquisition histories, it is occasionally possible to throw new light on them. These unprovenanced or so-called 'passportless' objects have attracted much less study than their excavated and better-known counterparts and, as they were purchased from antiquities dealers rather than coming direct from excavation, even their authenticity has sometimes been questioned as skilful copies and fakes are known since the 19th century. Consequently, items acquired from private collections have been placed in the reserve collection and been overlooked or even ignored by many researchers. However, on the basis of our research we are now able to re-attribute these objects to known sites: a detailed comparative approach helps restore their significance and thus fill in some small gaps in the archaeological collections acquired in the 19th century by the State Hermitage Museum.

The main starting point of my research has been to characterise the individual features of the gold appliqué plaques by examining their manufacturing features (stamped, cut out around the edges, relative purity) and means of attachment (the quantity and distribution of perforations or the presence / absence of loops on the reverse) and, if the unprovenanced items share all the characteristics of those known from excavation, there are reasonable grounds to assign them to the same findspots. Using this approach creates an opportunity to redress the lack of provenance over 150 years after their discovery and my work has therefore enabled the identification of many items found at famous Scythian burials among these purchases. They supplement the main collection and help reconstruct the original buried assemblages prior to excavation and looting: through this method we have so far succeeded in re-attributing 12 gold objects to specific findspots.

The most famous Scythian monument to be looted soon after its discovery is the Kul-Oba kurgan. For a long period precious objects found there were sold on the art market and entered private collections and museums around the world. Among the huge number of appliqué plaques found there it is possible to identify some which were impressed with unique dies not found elsewhere: these include gold plaques cut out along the edge with an image of a seated griffin. From the excavations of the Kul-Oba kurgan, 18 same identical plaques were delivered to the Hermitage, and in addition, four more

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Figure 1. Gold plaque in the form of a seated griffin (The State Hermitage Museum, St. Petersburg, inv. nr. GR 19202; photograph by Alexander Lavretnyev)

examples were received in 1926 from the collection of Stroganov.[2]

Among purchases made in 1893 from Gilles Lemmé, a private collector, the Hermitage has a similar plaque representing a seated griffin (Figure 1). On this we can see a very clear depiction of a griffin with raised wings which exactly matches that on plaques excavated at Kul-Oba and executed with the same punch. In addition to this, another is in the British Museum and four plaques from private collections are kept in the State Historical Museum,[3] thus we now know of 28 plaques of this type, 18 from excavations at Kul-Oba and 10 from private collections.

An appliqué plaque representing a hare is from the same kurgan but this is not in the usual style as most depict a reclining hare with raised front paw and stamped on rectangular plaques: as many as 46 are known from the Chertomlyk kurgan.[4] However, much less common are those representing a crouching hare with its ears pressed back and these are cut around the edge rather than being stamped (Figure 2). Rectangular appliqué plaques with a running hare design have only been found in the Kul-Oba kurgan: 18 plaques entered the Hermitage from these excavations and another received as part of the Stroganov collection in 1926.[5] In addition to the Hermitage, three European museums possess plaques of this type, namely one in the British Museum (part of a small collection of five gold plaques

Figure 2. Gold plaque in the form of a hare (The State Hermitage Museum, St. Petersburg, inv. nr. GR 17683; photograph by Alexander Lavretnyev)

purchased in 1909 from one F. Champness),[6] four from private collections in the State Historical Museum and one in the Berlin State Museums.[7] A plaque obtained with purchases in 1893 is similar to these (Figure

[2] Kopeikina 1986: 31, 34, cats 20–21.

[3] Marshall 1911: 238, pl. XL, no. 2106a (British Museum, inv. nr. 1909,0617.1); Zuravlev, Novikova and Shamakhanskaya 2014: 113–15, cats 33–34, 56, 69.

[4] State Hermitage Museum, inv. nr. Dn 1863 1/243; Alekseev 1986: 69, cat. 33.

[5] Kopeikina 1986: 30, 42, cats 7, 7a.

[6] British Museum, inv. nrs 1909,0617.1–5, all from Kul-Oba: four are discussed here and the fifth which shows a pair of back-to-back archers published by Simpson and Pankova eds 2017: 206–207, cat. 119; see also Loades, this volume.

[7] Marshall 1911: 238, pl. XL, no. 2106b (British Museum, inv. nr. 1909,0617.3); Zuravlev, Novikova and Shemakhanskaya 2014: 113–15, cats 37–39, 70; Greifenhagen 1970: vol. I, 39, pl. 16.5.

Figure 3. Gold plaque in the form of a running hare (The State Hermitage Museum, St. Petersburg, inv. nr. GR 19196; photograph by Alexander Lavretnyev)

Figure 4. Gold plaque in the form of a recumbent lion (The State Hermitage Museum, St. Petersburg, inv. nr. GR 6684; photograph by Alexander Lavretnyev)

3). When comparing the plaque from Kul-Oba with one from the Lemmé collection, we see that they are identical and proves that they were made with the same die and come from the same workshop, and also implies they come from the same burial. As a result, we may add one plaque with a running hare from the Lemmé collection to the 19 already known in the Hermitage collection.

Some types of appliqué plaques are known by single examples, such as a contoured plaque in the form of a recumbent lion and in the Hermitage there is one such plaque found in the Kul-Oba kurgan.[8] However, a second entered the art market and was sold to the British Museum.[9] A third such plaque was in the Lemmé collection and entered the Hermitage but lay unnoticed there until recently (Figure 4). Comparing it with the other two plaques, it is clear that all were struck with the same die and considering that only two others are known, the discovery of this third example is significant.

Another unusual representation is that of a youth in a so-called 'kneeling run' position. This has been found at several Scythian kurgans. The earliest version was found in the second 'Seven Brothers' kurgan: it is in openwork and cut out along the edge in an archaic style which is very different to the later examples.[10] 13 plaques from Kul-Oba should be named next.[11] They are cut out along the edge rather than being in openwork and depict the figure in Classical style. Plaques with such a design exist in the British Museum and the Historical Museum in Moscow.[12] It should be noted that these are impressed with different dies: on one the youth has a slender figure and wavy hair, whereas on the other the figure is more substantial and has straight hair. During the 20th century the Chersonesus kurgan was re-excavated and the findings more carefully documented.[13] Among more than 500 plaques were found, there are further examples of the same form showing an athletic youth with straight hair. They have the least sportsmanlike appearance of all the known versions of this type. Another plaque from the Lemmé collection is much closer in style to

[8] Kopeikina 1986: 31, 52, cat. 22.

[9] Marshall 1911: 238, pl. XL, cat. 2106c (British Museum, inv. nr. 1909,0617.4); Zuravlev, Novikova and Shemakhanskaya 2014: 118–19, cat. 36.

[10] State Hermitage Museum, inv. nr. SBr. II-14; Artamonov 1966: 36, table 110.

[11] State Hermitage Museum, inv. nr. KO-69; Kopeikina 1986: 31, 52–53, cat. 23.

[12] Marshall 1911: 237–38, pl. XL, nos 2105–2106 (British Museum, inv. nrs 1846,0629.10 (Campanari collection, erroneously reported as 'from Vulci'; 1909,0617.5); Zuravlev, Novikova and Shemakhanskaya 2014: 66–71, cats 14–15, 63, 77.

[13] Leskov 1972: 56–57, cat. 34.

Figure 5. Gold plaque in the form of a youth in a 'kneeling run' position (The State Hermitage Museum, St. Petersburg, inv. nr. GR 20152; photograph by Alexander Lavretnyev)

the 13 plaques from the Kul-Oba kurgan than to other versions, hence most likely originates from there (Figure 5).

In the great burial of the sixth kurgan in the 'Seven Brothers' group, 36 sewn appliqué plaques representing a sphinx seated in profile to the left originally decorated the clothing of the deceased.[14] This burial dates to the second half of the 5th century BC and these plaques are characterised by a special archaic image style not found elsewhere.[15] Among the Lemmé collection two appliqué plaques showing sphinxes are similar to these and are of a very high artistic standard (Figure 6). A careful comparison allows us to conclude that the die of one plaque from the Lemmé collection corresponds to that used on the plaques found in the 'Seven Brothers' kurgans although the stamp of the second differs slightly, for example in the manner of depiction of the sphinx ribs and wing feathers. As there is no reason to doubt the authenticity of the second plaque, it is possible therefore not only to identify plaques with sphinxes from the collection of Lemmé as originating from the great burial of the sixth kurgan of the 'Seven Brothers' group, but also to establish that at least two dies were used to make them.

In the second kurgan of the 'Seven Brothers' group there is also an openwork cutout plaque in the form of a lion with its head reversed, and 11 of the excavated examples entered the Hermitage.[16] Another exists in the Lemmé collection: it is neatly impressed and the die identical to that used for the manufacture of the excavated plaques found in the second 'Seven Brothers' kurgan (Figure 7).

Another plaque depicting a lion pouncing on the back of a deer exists in the Hermitage collection (Figure 8). Six plaques impressed with the same die were found in the fourth chamber of the Chertomlyk kurgan excavated by Ivan Zabelin in 1862/63 and dated to the 4th century BC. The results of this excavation are well documented and published.[17] According to Zabelin's report, seven of these plaques were found but only six are kept in the Department of Archaeology of Eastern Europe and Siberia in the Hermitage.[18] What happened to the seventh? It is known that some of the finds were transferred to Ekaterina Petrovna Zeifart, the owner of the land where the kurgan is located in return for permission to excavate but the Imperial Archaeological Commission recognised the importance of keeping the assemblage complete and made attempts to recover them. They were unsuccessful and these group of finds were considered lost.[19] We can now assume that Zeifart sold items to antiquities dealers and they were purchased by Lemmé for his collection. Close comparison of this item from the Lemmé collection with the six surviving examples from Chertomlyk shows they are identical, which means that the previously missing example is now recovered.

The same can be said about a plaque in the form of a flower (Figure 9). According to Zabelin, 29 of these were discovered during the excavation of the Chertomlyk

[14] State Hermitage Museum, inv. nr. SBr-VI-2.
[15] Artamonov 1966: 38, fig. 67.
[16] Artamonov 1966: 36, fig. 41.
[17] Zabelin 1872*a*: 74–118; cf. Alekseev, Murzin and Rolle 1991: 12–13.
[18] Alekseev, Murzin and Rolle 1991: 249 (State Hermitage Museum, inv. nr. DN 1863 1/221).
[19] Archive of The State Hermitage Museum F.1 I.5 case 10-1865: 36, 38.

Figure 6. Gold plaque in the form of a seated sphinx (The State Hermitage Museum, St. Petersburg, inv. nr. GR 19198; photograph by Alexander Lavretnyev)

Figure 7. Gold plaque in the form of a lion with its head reversed (The State Hermitage Museum, St. Petersburg, inv. nr. GR 19199; photograph by Alexander Lavretnyev)

kurgan;[20] the Hermitage now has 28.[21] However, another such plaque entered the Hermitage from the collection of Lemmé but its provenance has not been recognised until now. However, comparison shows that they are identical in die, weight and purity of the gold.

[20] Zabelin 1872*a*: 104.
[21] Alekseev, Murzin and Rolle 1991: 174, cat. 100; Alekseev 1986: 67, cat. 17.

Figure 8. Gold plaque in the form of a lion pouncing on a deer (The State Hermitage Museum, St. Petersburg, inv. nr. GR 20491; photograph by Alexander Lavretnyev)

Figure 9. Gold plaque in the form of a flower (The State Hermitage Museum, St. Petersburg, inv. nr. GR 20503; photograph by Alexander Lavretnyev)

Such plaques have not been found elsewhere, thus the Lemmé plaque must be the previously unaccounted plaque from Chertomlyk, most likely entering the antiquities market and being acquired by Lemmé for his collection.

Some sewn-on appliqué plaques are unique or rare but others have designs which were much more common and have been found at several kurgans. In these cases, when looted and circulating via the antiquities market, it is impossible to correlate them with any particular archaeological site, yet it is possible to date them within a century. When studying unprovenanced items, it is necessary to pay particular attention to the respective dates of discovery of excavated pieces and those of the sale and purchase of those on the antiquities market. For example, sewn-on appliqué plaques in the form of a head crowned with an ivy wreath were found at several famous Scythian burials dating to the 4th century BC. This individual is usually identified as the young god Dionysus or a maenad follower. Three such plaques are in the collection of Lemmé and two were published in 1884 in a short catalogue of this collection (Figures 10–12).[22] We can therefore exclude sites such as the Oguz kurgan which was excavated after that date as the origin of these but that still leaves Kul-Oba, Chertomlyk and the Alexandropol kurgan as possible contenders.[23]

Throughout the 4th century BC plaques in the form of rosettes were particularly popular but vary in composition and the number of petals. In the Lemmé collection there is a nine-petalled rosette, 2.6 cm in diameter, made of dense gold leaf (Figure 13). The figure is clearly impressed and the edges neatly cut. This is high-quality work and this type is known from only three kurgans: Kul-Oba, Chertomlyk and Great Bliznitsa.[24] However, it is impossible to say exactly where the piece originates since the rosettes from these three kurgans are almost identical to one other, but it can be confidently dated to the second half of the 4th century BC as such a stamp was not used later.

[22] Anon. 1884: pl. I.1, 3.
[23] Kopeikina 1986: 44–45, cats 9–11; Alekseev 2012: 228–29; Onayko 1970: 48, cat. 497.
[24] Kopeikina 1986: 47, cats 16–16a.

Figure 10. Gold plaque in the form of the young god Dionysus (The State Hermitage Museum, St. Petersburg, inv. nr. GR 17725; photograph by Alexander Lavretnyev)

Figure 11. Gold plaque in the form of the young god Dionysus (The State Hermitage Museum, St. Petersburg, inv. nr. GR 19195; photograph by Alexander Lavretnyev)

Figure 12. Gold plaque in the form of the young god Dionysus (The State Hermitage Museum, St. Petersburg, inv. nr. GR 19197; photograph by Alexander Lavretnyev)

Figure 13. Gold plaque in the form of a rosette (The State Hermitage Museum, St. Petersburg, inv. nr. GR 19200; photograph by Alexander Lavretnyev)

Figure 14. Hilt of a Scythian sword (The State Hermitage Museum, St. Petersburg, inv. nr. GR 14320; photograph by Alexander Lavretnyev)

We come now to the most important result of this study which is the successful re-attribution of a hilt of a Scythian short sword, purchased by the Hermitage from the antiquities dealer Eustafiy Kiriyakov in 1886. The iron hilt is covered with gold leaf with an embossed relief image of a reclining deer being stalked by a lynx; the sides of the pommel are in the form of an oval medallion representing the elongated figure of a spotted predator and the guard represents a pair of griffins facing each other in a heraldic pose (Figure 14). In 1863, during the previously mentioned excavations by I.E. Zabelin at the Chertomlyk kurgan, a burial was found in the fifth chamber in niche 'E' and, according to Zabelin's description, 'three swords with golden hilts were thrust into the wall. Only rusty blades remained in the wall, and the hilts were already lying on the ground'.[25] In his report on the silver vessel from Voronezh, Rostovtseff refers to these. The publication of the Chertomlyk kurgan by Zabelin reproduced all three hilts but two swords with hilts and a blade without a hilt are held in the Department of Archaeology of the Eastern Europe and Siberia of the Hermitage, and the hilt of the third was considered until recently to be lost (Figure 15).[26] It is unknown exactly when or how this third hilt was separated from the others but evidently it entered the antiquities market. In 1886 a resident of Kerch, Mr Eustafiy Kiriyakov, sold a large collection of antiquities and the Hermitage archive contains details of this sale,[27] including a list of all items purchased from him, of which the sword hilt is the first to be listed.[28] This artifact was then added to the reserve collection of unprovenanced objects and remained there without careful study until now. However, a comparison of the hilt with the drawing by Zabelin proves that it is the same object as the embossed design on the hilt number 12 corresponds exactly with the drawing on the hilt bought from Kiriyakov (Figure 15). Moreover, in both cases a predator resembling a feline with its head turned towards the viewer is represented on both, whereas it was more typical on Scythian artifacts for the animals to be portrayed in profile. It is therefore

[25] Zabelin 1872*a*: 112; 1872*b*: pl. XL.9, 12, 14.
[26] Alekseev, Murzin and Rolle 1991: 102–103, cat. 188 (blade without hilt from the Chertomlyk kurgan); Topal 2014: 130.
[27] Archive of The State Hermitage Museum F.1 I.5 case 19-1886: 1–7.
[28] Archive of The State Hermitage Museum F.1 I.5 case 19-1886: 2.

Figure 15. The hilt of the Scythian sword

clear that the entire set of swords from the 'E' niche of the fifth burial chamber of the Chertomlyk kurgan are now safely held in the Hermitage.

Conclusions

This study confirms the identification of the original findspots for 11 sewn-on appliqué plaques and the hilt of a Scythian sword which had hitherto been regarded as devoid of any provenance. In addition, four sewn-on plaques have been more closely dated and identified as also originating from Scythian burials. These identifications are based on the study of a tiny proportion of the collection of ancient personal ornaments from old private collections which are held in the State Hermitage Museum and analyses currently underway are expected to add further new results.

Scientific study of the etching process used on ancient carnelian beads

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Abstract

Etched carnelian beads are a striking example of the very high level of technological skills developed by ancient civilisations to create ornament and jewellery. This study combines the characterisation of etched areas of archaeological beads from the British Museum collection with the experimental etching of modern carnelian in laboratory conditions, based on ethnographic descriptions from the 1930s by Mackay and Majumdar, in order to understand the manufacturing technology of etched carnelian beads. The characterisation of etched archaeological beads was carried out using optical/digital microscopy and scanning electron microscopy coupled with energy dispersive X-ray spectroscopy, combined with X-ray diffraction and Raman spectroscopy. Experimental etching started with the making of the etching agent, substituting the traditionally used but unavailable *Capparis Aphylla* juice with sodium alginate and mixing it with an alkali in the form of washing soda. The experiment continued with the application of this etching agent on the surface of modern unpolished carnelian samples. These were fired in an electric kiln under a range of conditions in order to optimise firing temperature and duration. The results from this scientific study suggest that the white designs etched on the surfaces of the beads are produced thanks to the dissolution of silica by the etching agent, which creates a network of fine pores that scatters the light. Experiments also revealed that the etching process was successful using sodium alginate and optimised around 450°C for 5 to 15 minutes.

Keywords: Etched carnelian beads; etching process; carnelian; optical microscopy; scanning electron microscopy; energy dispersive X-ray analysis; Raman spectroscopy

Introduction

Etched carnelian beads have attracted a large amount of interest among archaeologists because their easily recognisable appearance allows them to be regarded as a proxy for trade and contact between different communities in antiquity. There has also been attention paid to their classification and trying to understand how they were made. A separate paper in this volume outlines the archaeological aspects of these beads,[4] hence this paper focuses on the results of a new scientific project aimed to better understand the processes by which these beads were made and builds directly on ethnographic observations made in India.

Enquiries in the early 1930s by M.G. Majumdar led to the realisation that 'this art had now practically died out in Sind' and at Sehwan 'the process was known only to a single man named Sabehdino who was about seventy-five years old'.[5] This man demonstrated the process to Mackay who promptly published a description of it.[6] Majumdar himself described the process as follows:

> 'Half a *chhatak* of washing soda is dissolved in two *tolas* of water, in which are rubbed pieces of the young shoots of the *Kirar* plant [*Capparis aphylla*]. The juice of the *Kirar* is thoroughly mixed with water, and the liquid is then strained through a piece of linen. The pattern is then drawn on the cornelian with a steel pen, using this liquid. Encased in an open clay mould, with the decorated portion exposed, the stone is next fired between two layers of charcoal. After some time the mould is taken out of the fire and allowed to cool under a cover. The soot adhering to the cornelian, from which the mould has now been separated, is then brushed off, bringing into view the decoration which has now permanently stuck to its body and assumed white colour. This artificial white incrustation set against a red background seems to have been much prized in older days, and continued to be in vogue even as late as the reign of the Talpur dynasty. After the British conquest cornelian and other semi-precious stones gradually went out of use, as more attractive and cheaper jewels of artificial make began to be imported into the market of Sind. The *Kirar*, which plays such an important part in the decoration of cornelian, grows wild in Sind, Baluchistan, parts of the United Provinces and Southern Punjab, and at spring-time puts on masses of small red flowers. It serves a fodder for camel, sheep and goats, and its fruits are eaten by some people in the form of pickles'.[7]

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[4] Simpson, this volume.
[5] Majumdar 1934: 46.
[6] Mackay 1933.
[7] Majumdar 1934: 47. This has been successfully recreated by Kenoyer (2007).

In the case of the black on white etched beads, the beads were entirely covered with alkali, the design added using a metallic solution of copper, cobalt or manganese, and then heated in the usual manner to between 300-400°C.[8] There are verbal reports of faked etched carnelian beads being made in Iran, Mark Kenoyer has shown it is possible to make copies readily easily but some other recent experimental attempts have not been as successful. One of the aims of the present study therefore was to understand and document the processes involved in this technology and test the conclusions of previous researchers within a controlled laboratory and using standard scientific techniques.[9]

According to Mackay and Majumdar, the etching agent, also referred to as 'paint', was made as a paste by mixing a 'sticky medium' and a solution of washing soda. Traditionally, the 'sticky medium' is the juice extracted from the dry maceration of the tips of young shoots of *Capparis aphylla*, a common local bush in the Indus valley.[10] This apparently helps the etching paste to stay in place on the carnelian during the firing. The texture of the medium is described as a 'thick pasty mass of an olive-green colour'.[11] This indicates that the colour of the media used to replace this local bush, unfortunately unavailable for the experiments, probably does not matter for the final result. Mackay does not give any quantitative information about the concentration of the solution of washing soda but Majumdar does, citing an Indian recipe.[12] According to Mackay a 'small quantity' of the soda solution is poured on the 'sticky medium', and both are rubbed together until a 'semi-fluid mass' is obtained.[13] This seems to suggest that the quantity of soda solution mixed with the 'sticky medium' needs to be small enough to keep a thick texture. The resulting paste is finally filtered through linen, presumably to remove any solid material. The carnelian bead is then placed in a 'setting of clay mixed with cotton-wool',[14] also described as 'an open clay mould'.[15] The paste is then applied on carnelian with a reed pen; the design is said to be 'difficult to see' at first but becomes visible when it has dried.[16] This may imply that the concentration of washing soda in the solution mixed with the 'sticky medium' is very high, since the evaporation of water will increase the soda concentration in the etching paste until it reaches the saturation limit. No indication is given about the drying time but the carnelian is heated on a sheet-iron on the 'embers of a charcoal fire until the design is perfectly dry'.[17] No indication of duration or temperature is given for this first heat treatment, but the temperature is most likely not very high if the bead is sitting over an open fire. The stone bead is then buried in the red-hot fire for 'about five minutes' in its mould;[18] no temperature range is given but they will be higher than during drying. The mould is then removed from the fire, and the carnelian removed from the mould to cool for about 'about ten minutes'.[19] It is interesting to note that the cooling was not done through quenching. It is finally cleaned up with a piece of cloth to remove the ash.

Despite their omnipresence, etched carnelian beads were mostly studied in the context of their ancient trade, and the etching technique itself has not been thoroughly scientifically investigated. Only a few studies have tried to chemically characterise the etching agent and explain the process.[20] They were often only partly successful, because elemental concentrations close to the detection limit of the instrument would have been difficult to detect using EDX or XRF. New generations of analytical instruments have become more sensitive and detection limits have improved; and the quantification of minor and trace concentrations would therefore be expected to be more accurate. This scientific research project aims to attempt to characterise the etching agent, chemically and physically, and understanding the etching process and the manufacture of these beads more generally.

Methodology

The chosen methodology to study the etched carnelian beads combines physical examination, chemical analysis and experimentation. Examination and analysis were undertaken on a selection of archaeological beads from the British Museum (BM) collection and compared with experimental results from etching modern carnelian.

Macro- and microscopic examinations

Macroscopic examination consisted of a study of the bead patterns, colour and apparent conservation state at low magnification. This was followed by microscopic examination to study the beads' surface texture, possible tool marks and signs of degradation. Images were recorded using a Leica DFC 500 digital camera attached to a Leica MZ APO binocular microscope (magnification range: x8 to x80) and a Keyence Digital Microscope (magnification range: x20 to x200). The latter has a much larger depth-of-field, which allowed a closer examination of the beads' surface and the full area in view to be seen in focus by creating a depth

[8] Sankalia 1970: 40–41. The technique used to create the black on red type is presumed to be a variation on this but without involving heating.
[9] Glover and Bellina 2003.
[10] Dhakad *et al*. 2016; Chahlia 2009.
[11] Mackay 1933.
[12] Majumdar 1934.
[13] Mackay 1933.
[14] Mackay 1933.
[15] Majumdar 1934.
[16] Mackay 1933.
[17] Mackay 1933.
[18] Mackay 1933.
[19] Mackay 1933.
[20] Tite 1986.

composition image. The surface texture of etched and unetched beads was compared to assess whether the etched beads had degraded in a different way. Close attention was also given to the difference between etched and unetched areas on a single bead. Examination at high magnification further helped identify relevant areas for compositional analysis. Optical microscopy was complemented by scanning electron microscopy (SEM) to record noteworthy surface texture details, and highlight features that may have not been visible under the light microscope. This was achieved using a Hitachi S-3700N VP (variable pressure) SEM set at 40 Pa and 20 kV acceleration voltage. Images were recorded in both back-scattered electron (BSE) and secondary electron (SE) modes to emphasise either composition or surface topography respectively.

Compositional analysis

Non-invasive analysis

Compositional analysis was carried out to characterise the stone and the etching agent chemically, using a combination of scanning electron microscopy equipped with energy dispersive X-ray analysis (SEM-EDX), Raman spectroscopy and X-ray diffraction (XRD). It should be noted that previous studies were unable to quantify differences between etched and unetched areas due to instrumental limitations.[21] The EDX compositional data were acquired over 150 s using an Oxford Instruments Aztec microanalysis system with an x-act silicon drift detector (SDD). Calibration was done using a pure cobalt standard, giving an output rate of *c.* 9500 counts per second under the conditions mentioned above. Linear scans were acquired with a step of *c.* 1.5 microns and a pixel dwell time of 3 s. Elemental maps were generally acquired over-night with a dwell time of 100 microseconds and a resolution of 2048 pixels (x axis).

Raman spectroscopy was used to check the nature of several of the archaeological beads. The spectra were obtained using a portable BWS415 i-Raman by BWTEK, which has a monochromatic beam of 532 nm in wavelength. Non-destructive XRD was also tentatively carried out on a selection of etched beads to identify the structure of the etched area, whether amorphous or crystalline, and, in the latter case, chemically identify the potential crystalline phases. This was done using a STOE Darmstadt diffractometer in reflection mode with a 'multi-purpose' stage designed to hold relatively small and flat objects. The energy of the X-ray beam is produced by a copper anode and is made monochromatic at the $K_{\alpha 1}$ emission line. The acceleration current and voltage were set at 40 mA and 40 kV. Measurements were taken at angles ranging from 5° to 100°.

[21] Tite 1986.

Invasive study

In addition to the non-invasive study of the beads, one etched archaeological bead was selected for sampling to obtain a fresh and non-degraded cross-section showing both etched and unetched areas.[22] This bead was selected because it was already broken and unprovenanced; sampling would therefore remain relatively inconspicuous. This cut cross-section was then cold mounted in a block of epoxy resin, ground on silicon carbide paper (Grit P120 to P1000) and polished down to 6 microns on polishing cloths made of woven natural silk. It was studied using microscopy and analysed in the Hitachi S-3700N VP SEM in high-vacuum mode and in a Field Emission Gun (FEG) Hitachi S-4800 SEM set at 20 kV acceleration voltage, which enables high-resolution imaging at very high magnification. Images were recorded at magnifications between 1,000 and 20,000 for an acquisition time of 160 s in SE and BSE modes.

Laboratory experiments

The experiments run in parallel were divided in three parts: the identification of the parameters that may influence the etching process, the making of the etching agent and finally the firing of modern carnelian beads onto which selected etching agents have been applied. A variety of etching agents were made following Mackay's description of the process.[23] Raw materials were carefully selected to make the etching agent. Quantities used were recorded precisely and various proportions of selected raw materials were trialled to understand their influence on the etching process. Despite several attempts, the plant juice (*Capparis aphylla*) used in the original recipe as a 'sticky medium' was unavailable; relevant substitutes were therefore selected instead, in order to obtain a texture close to the one described by Mackay.[24] These substances included starch, sodium alginate, buckwheat honey, 'Hard Natural Resin' from the museum's reference collection and two different types of gum Arabic, a solid sample from the reference collection and a commercial one in solution. The alkali used for the reproduction experiments were commercially available washing soda and laboratory-grade sodium carbonate. Washing soda powder was analysed by XRD using the STOE Darmstadt diffractometer, this time in transmission mode.

The pH of each 'sticky medium' was measured using pH paper. The 'stickiness' was defined as a qualitative parameter to assess the fluidity of the pastes prepared for the experiments. This 'stickiness' was measured by putting a drop of 'sticky medium' on a glass panel tilted at an angle of 65° and measuring the distance travelled

[22] BM 1991,1008.29.
[23] Mackay 1933.
[24] Mackay 1933.

when flowing freely for two minutes. This was achieved to compare the capacity of the paste to stay in place when applied on a curved surface. The weight of each drop was not measured quantitatively but assessed qualitatively by eye in order to reduce its influence on the free-flowing process. Some experiments were repeated twice to correct the influence of the weight when it was considered too significant the first time round. Although human error in this qualitative pilot trial will be unavoidable, these measurements gave a relatively good idea of the stickiness of each medium.

The etching pastes produced by mixing a 'sticky medium' with an alkaline solution were then applied on modern carnelian beads. They were applied on both polished and unpolished surfaces. The latter were obtained by cutting the modern beads in 2-3 mm-thick slices. The firing cycles were carried out in a Falcon CU4 kiln controlled by a Bentrup TC 405 programmer. The firing temperature varied between 400°C and 1000°C and several process durations were tested. The resulting etched samples from these experiments were then compared with the archaeological beads from the museum collection. Of all parameters, which could potentially influence the etching process, the ones, which could properly be controlled, were assessed. Selected fired samples were cut to reveal transversal cross-sections and mounted in epoxy resin. The epoxy-resin blocks were ground on silicon carbide paper (Grit P120 to P1000) and polished down to 3 microns on polishing cloths made of taffeta woven 100% wool. They were then analysed using the Hitachi S-3700N VP SEM in high-vacuum mode. Raman spectra were acquired using a Labram Infinity Raman spectrometer by ISA Dilor – Jobin Yvon – SPE (part of the Horiba group), with a green 532 nm laser. This instrument is equipped with microscope objectives going up to 1000x magnification; spectra were recorded at magnifications x500 and x1000.

Results

Examination of archaeological beads

The conventional colours of carnelian include all shades of flesh-red, as well as intermediate orange and red-brown.[25] This description fits all the presently studied archaeological beads, except for a half-preserved half-black half-whitish bead from Khotan (Xinjiang).[26] This bead may either not be made from carnelian or be a dyed carnelian bead.[27] The shades of red/orange/pink tend to be very variable and range from flesh pink, whitish pink and orange, to reddish orange and reddish brown (Figure 1: above). Several beads are also banded.

The beads' sizes and shapes are also very diverse (Figure 1: right). The smallest one is c. 6 mm long and the longest c. 49 mm,[28] while shapes vary from tabular, spherical and cylindrical to barrel-shaped. Their etched patterns range from relatively simple to very complex. The complexity of patterns on archaeologically contextualised beads seems to match the time period from Beck's classification. Although several designs observed on the archaeological beads from the BM collection are very similar to ones described by Beck (Figure 2),[29] many are not. Some beads also have patterns in common.[30]

The designs are white on almost all of the beads. Nevertheless, the patterns on a few have partially turned yellowish and one[31] is partly reddish-brown (Figure 3). The preservation state of the design varies greatly between beads. Some designs are well preserved,[32] but some appear to be either partially erased,[33] eroded,[34] or scratched[35] (Figure 4). The different burial environments seem to have eroded the beads to various degrees. The position of the pattern on the carnelian also seems to differ between the beads. A few seem to have had grooves carved before the etching paste was applied,[36] but most seem to have been etched by applying the paste directly onto the bead's surface. Finally, the central perforations allowing the bead to be threaded on a string are often mis-aligned (Figure 5), as they were drilled from both ends.[37] However, several beads, such as 1991,1008.41, 1930,1213.515 and 1935,1207.571, show an almost continuous threading hole.[38] Some drilling marks are visible in the holes as well as near their edges (Figure 6).

A combination of light microscopy and SEM revealed conchoidal fractures on the surface, common to most beads (Figure 7), which are characteristic of the degradation of quartz.[39] They are observed on both unetched and etched areas of a single bead. A few beads also show scratches (Figure 8), which are likely resulting from wear.[40] The surface texture of etched areas confirms the observations made macroscopically. The etched patterns are severely degraded on some beads, and still in a very good state on others. Relevant degradation effects include disappearance, erosion or pitting of the etched area (Figure 9).

[25] Hall 1994: 93; Sax 1996.
[26] BM MAS.191.
[27] Sax 1996.
[28] BM 1930,1213.97; 1991,1008.25 respectively.
[29] Beck 1933: BM 1922,0601.292 (Beck's group C5); etched bead from necklace 1928,1009.93 (Beck's group A23); MAS.191 (Beck's group B3).
[30] BM 1991,1008.15; 1991,1008.17; 1991,1008.35.
[31] BM 1991,1008.50.
[32] E.g., BM 1991,1008.17.
[33] BM 1935,1207.572.
[34] BM 1930,1213.515.
[35] BM MAS.224.
[36] BM MAS.191; 1991,1008.37.
[37] Mackay 1937.
[38] BM 1991,1008.41; 1930,1213.515; 1935,1207.571.
[39] Fondel 1962: 107; M. Sax, personal communication.
[40] M. Sax, personal communication.

Figure 1. Etched carnelian beads from the BM collections of various colours (above) and of various shapes (right)

Figure 2. Etched carnelian beads from the BM collections classified following Beck's groups

Figure 3. Etched carnelian beads from the BM collection
with white or yellowish-brown designs

Figure 4. Etched carnelian beads from the BM collection with degraded patterns
and showing an almost continuous central threading hole

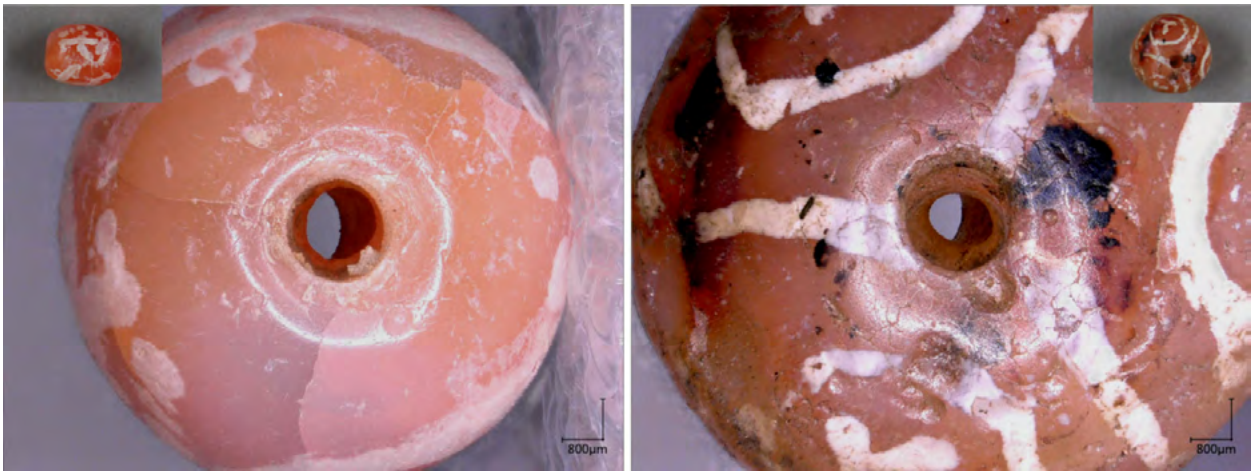


Figure 5. Typical features of mis-aligned central perforations on beads
from the BM collection (scale 0.8 mm)

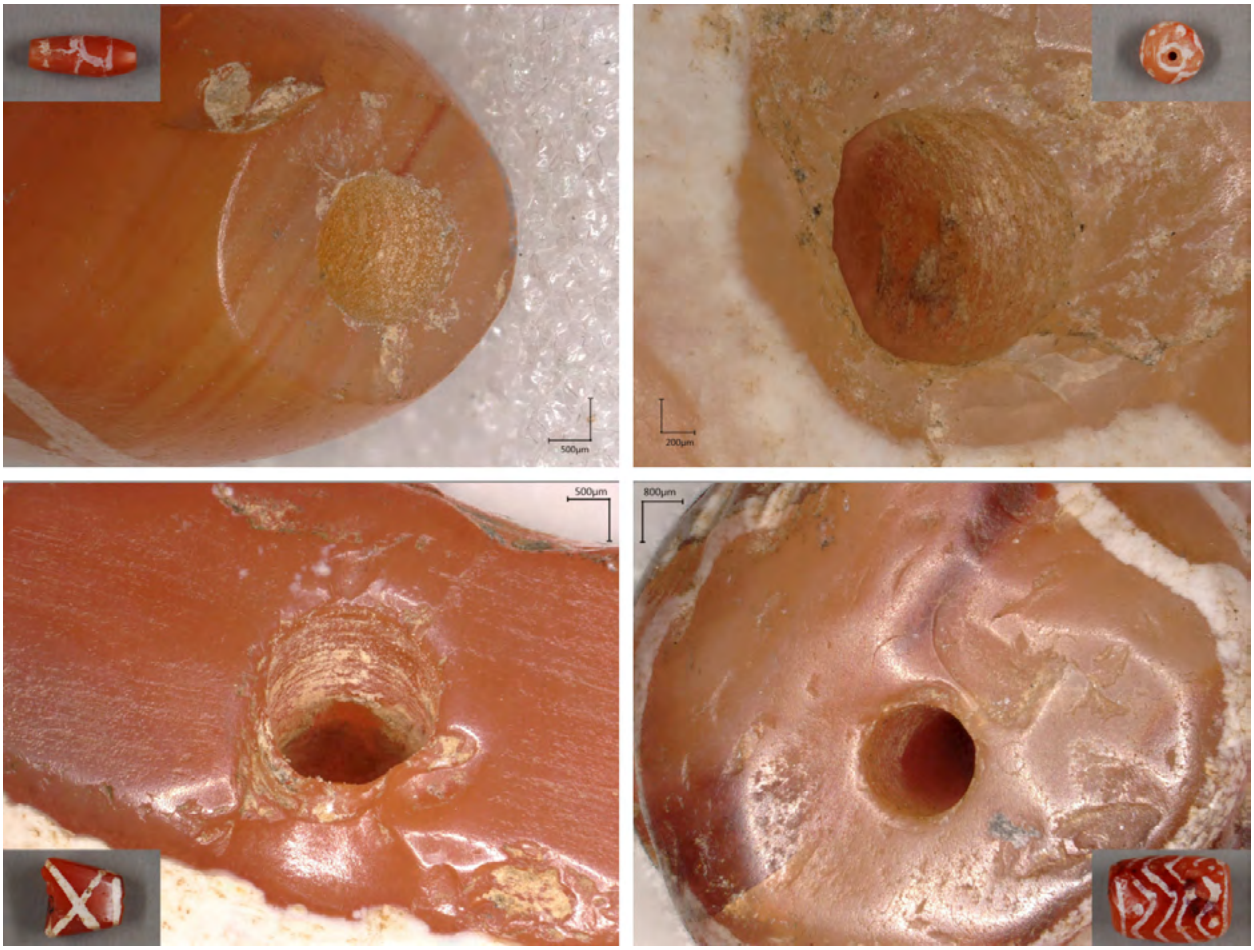


Figure 6. Drilling marks and edges of threading holes on beads from the BM collection (scales: left top and bottom 0.5 mm; top right 0.2 mm; bottom right 0.8 mm)

The etched designs appear glassy under the microscope, in a different way from what the results from etching usually look like. Although this glassy aspect seems intensified under the microscope light, the BSE images of the polished cross-section of the sampled archaeological bead clearly show a network of fine pores of *c.* 0.5 to 2 microns in diameter, closer to the surface (Figure 10). Many etched beads display a network of micrometric fractures ranging from 50 to 500 microns at the interface between the plain carnelian and the etched designs, which are parallel to the surface (Figure 11). These may be due to locally higher strain within the crystal lattice, because the microstructure may be different on either side of the interface. These fractures may have appeared as a result of degradation, or during firing or cooling.

Compositional analysis

Non-invasive analysis

The Raman spectrum acquired on the modern carnelian used in the experiment was selected as reference for comparison with unknown data. Most Raman peaks detected on the reference material can be attributed to the α-quartz phase (main phase of chalcedony) (Figure 12). Additionally, the peak detected at 503 cm^{-1} is the major signal of moganite, a quartz monoclinic polymorph,[41] which is a characteristic phase of carnelian. Haematite was not detected by Raman spectroscopy, though it is known to be responsible for the red colour of the carnelian.[42] This may be due to the quantity of haematite being below detection limits of the Raman instrument (iron oxide was detected at trace levels of 0.14 ± 0.02 wt% in the modern carnelian using SEM-EDX).

Given that the colours and shades of red/pink of the archaeological beads from the BM collection are so diverse, Raman spectroscopy was carried out on beads of different colours to confirm the nature of the stone and spectra acquired on six specimens ranging from pale pink,[43] tan,[44] flesh pink,[45] deep orange[46] and reddish brown[47] to half black/half off-white.[48] The

[41] Kingma and Hemley 1994; Kadlečíková *et al.* 2015.
[42] Fondel 1962: 207.
[43] BM 1908,0613.14.
[44] BM 1932,1008.xxx.
[45] BM 1991,1008.7.
[46] BM 1991,1008.29.
[47] BM 1991,1008.50.
[48] BM MAS.191.

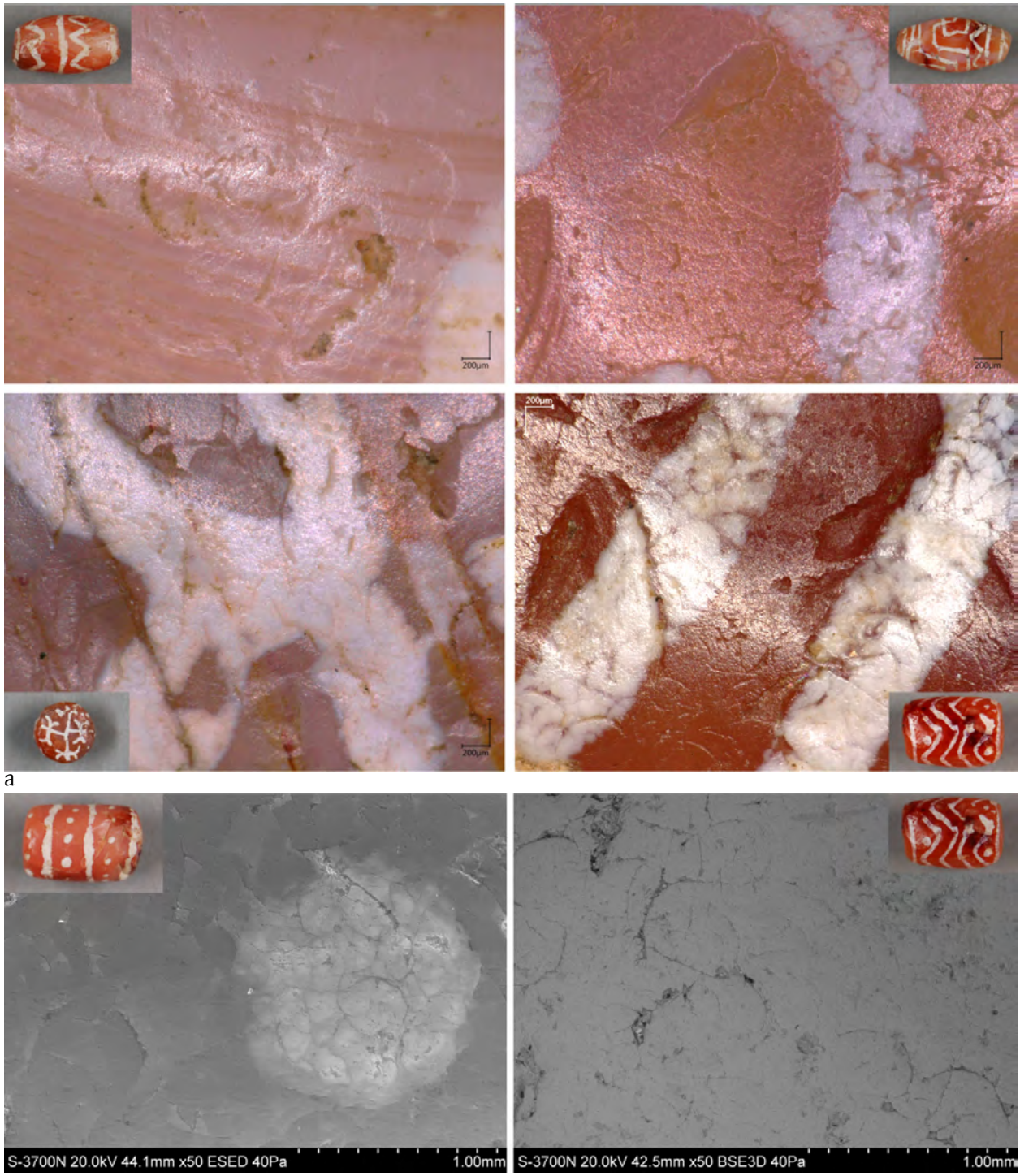


Figure 7. (a) Photomicrographs (scale 0.2 mm) and (b) SEM images of marks resulting from degradation processes

spectra of the selected historical beads all appear relatively similar to the carnelian reference spectrum (Figure 13). The main sharp peak at 465 cm^{-1}, attributed to quartz, is visible in all spectra. The fluorescence generated by several beads however meant that the signal-to-noise ratio was too low for peaks to be observed.[49] Despite the fluorescence, it is safe to say that most of the selected beads are carnelian, according to their spectra and their visual aspect. One bead colour is however reminiscent of agate or could be a black-dyed carnelian bead.[50]

Non-invasive XRD was carried out on three etched beads,[51] but was unfortunately unsuccessful in

[49] This was the case especially for beads BM 1932,1008.xxx; MAS.191.

[50] BM 1932,1008.xxx; MAS.191; cf. Sax 1996.

[51] BM 1908,0615.14; 1991,1008.35; MAS.191.

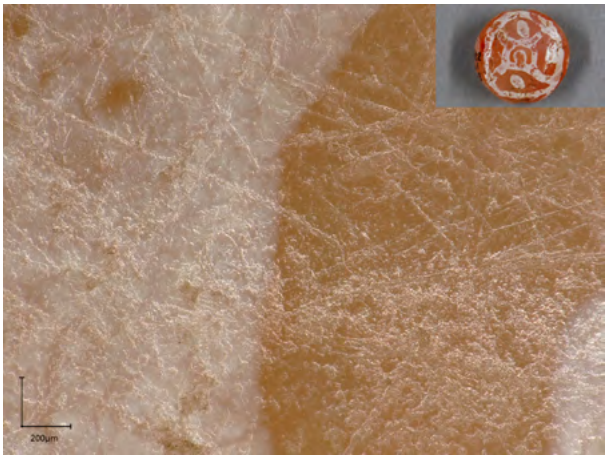


Figure 8. Scratches most likely resulting from wear on etched and unetched areas of beads from the BM collections (scale 0.2 mm)

Figure 10. SEM BSE image of bead showing a network of fine pores in the etched area (British Museum, inv. nr. 1991,1008.29)

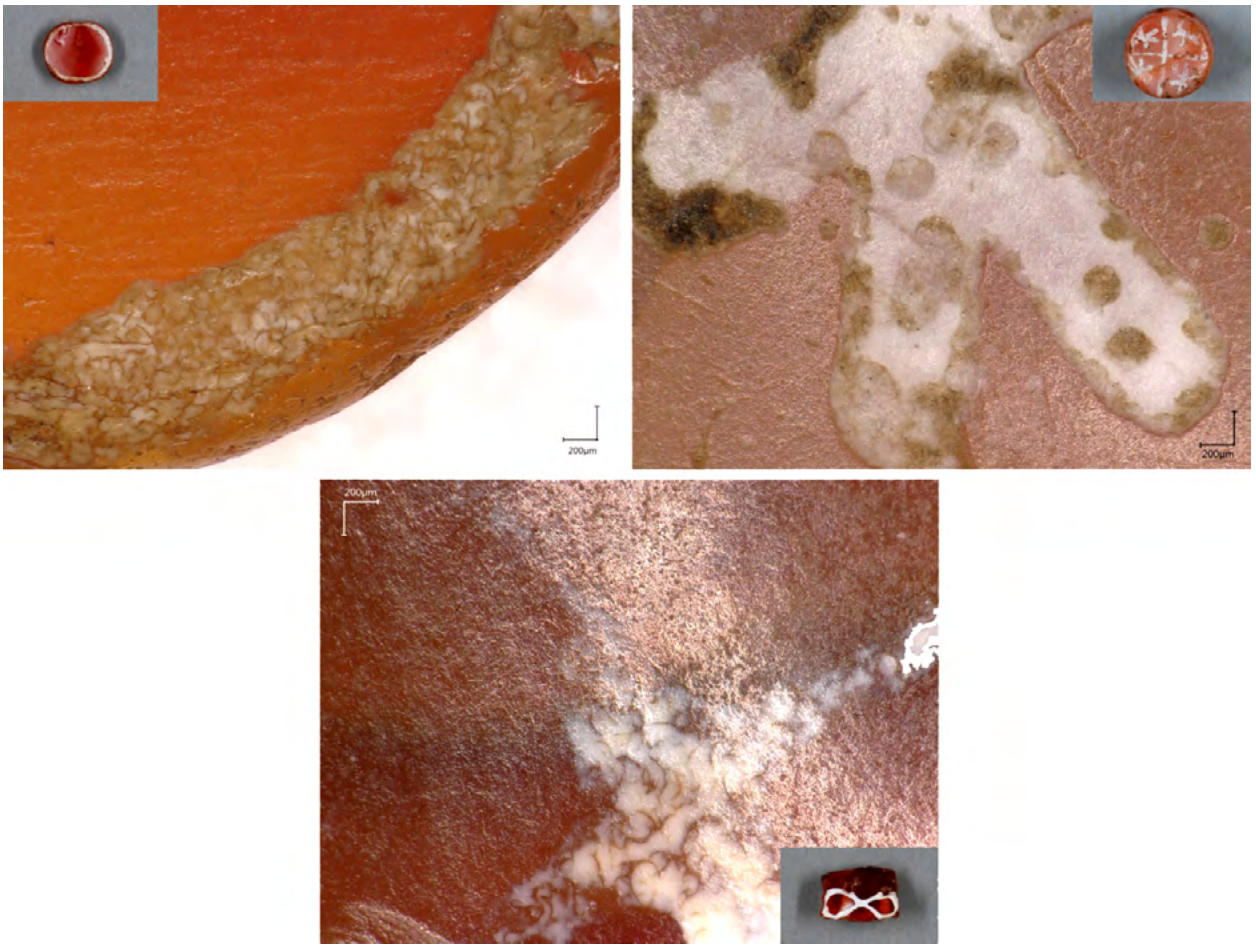


Figure 9. Etched areas of beads from the BM collections, showing clear signs of weathering or degradation (scale 0.2 mm)

differentiating etched and unetched areas. One very useful piece of information obtained with this technique was the absence of the typical signal given by an amorphous phase, such as glass, suggesting that the etched areas of the beads have a crystalline structure. This would argue against the formation of a low-melting glass as part of the etching process, as suggested by Glover and Bellina.[52]

[52] Glover and Bellina 2003.

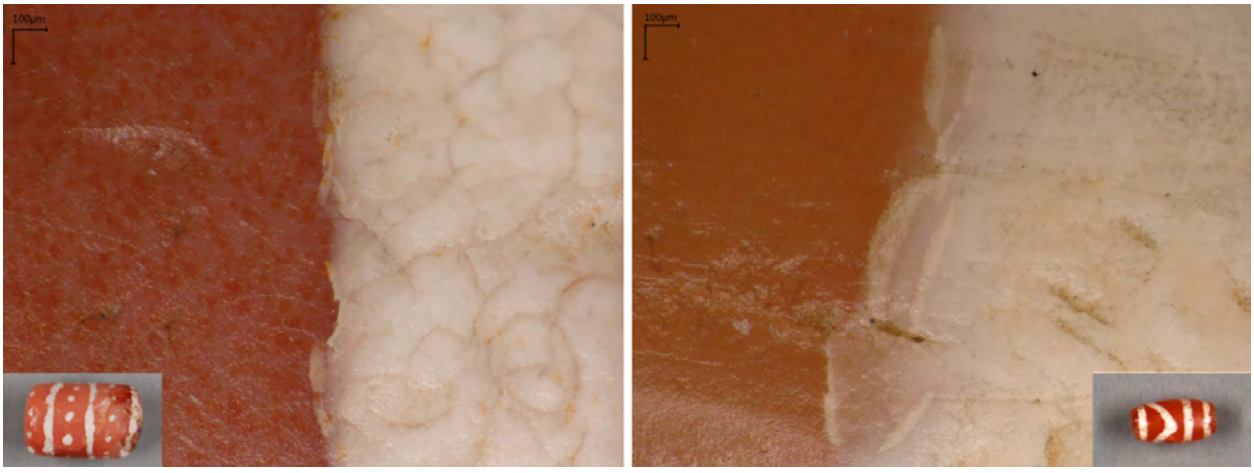
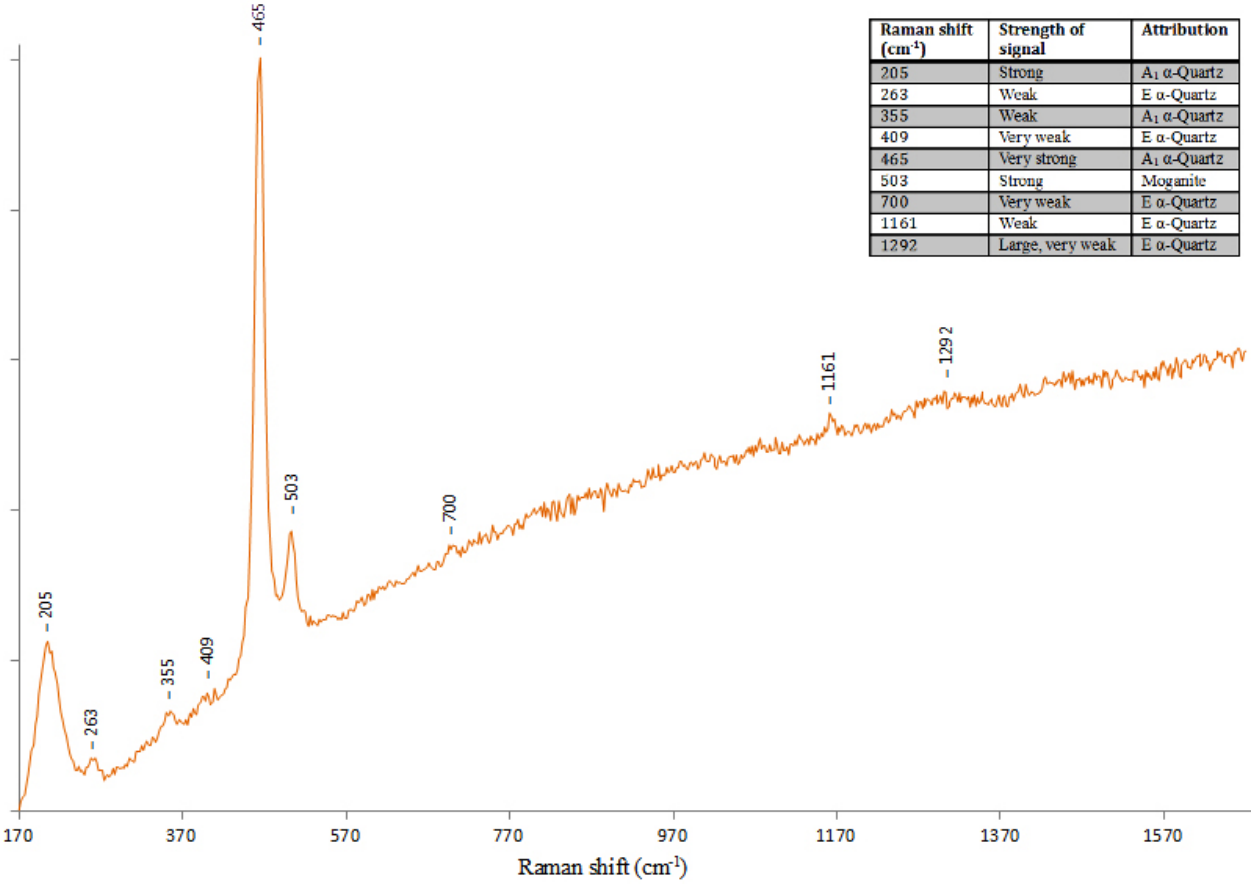


Figure 11. Photomicrographs of micrometric fractures at the interface between the etched and unetched areas on beads from the BM collections (scale 0.1 mm)



Raman shift (cm^{-1})	Strength of signal	Attribution
205	Strong	A_1 α-Quartz
263	Weak	E α-Quartz
355	Weak	A_1 α-Quartz
409	Very weak	E α-Quartz
465	Very strong	A_1 α-Quartz
503	Strong	Moganite
700	Very weak	E α-Quartz
1161	Weak	E α-Quartz
1292	Large, very weak	E α-Quartz

Figure 12. Peak attribution on the Raman spectrum of modern carnelian, selected as reference spectrum in this study

The results of the SEM-EDX confirmed that carnelian is mainly composed of silica, with minor amounts of other oxides, such as iron, sodium, potassium, calcium, sulphur and magnesium. The average concentration of silicon oxide was *c.* 98.3 wt% (with an average of *c.* 97.7 wt% in unetched areas and *c.* 98.8 wt% in etched areas). This average concentration appears lower than that given in the literature.[53] These lower values may be due to the degradation of the beads or the addition of post-depositional material from the burial environment.

[53] E.g., 99.4% in Fondel 1962: 200.

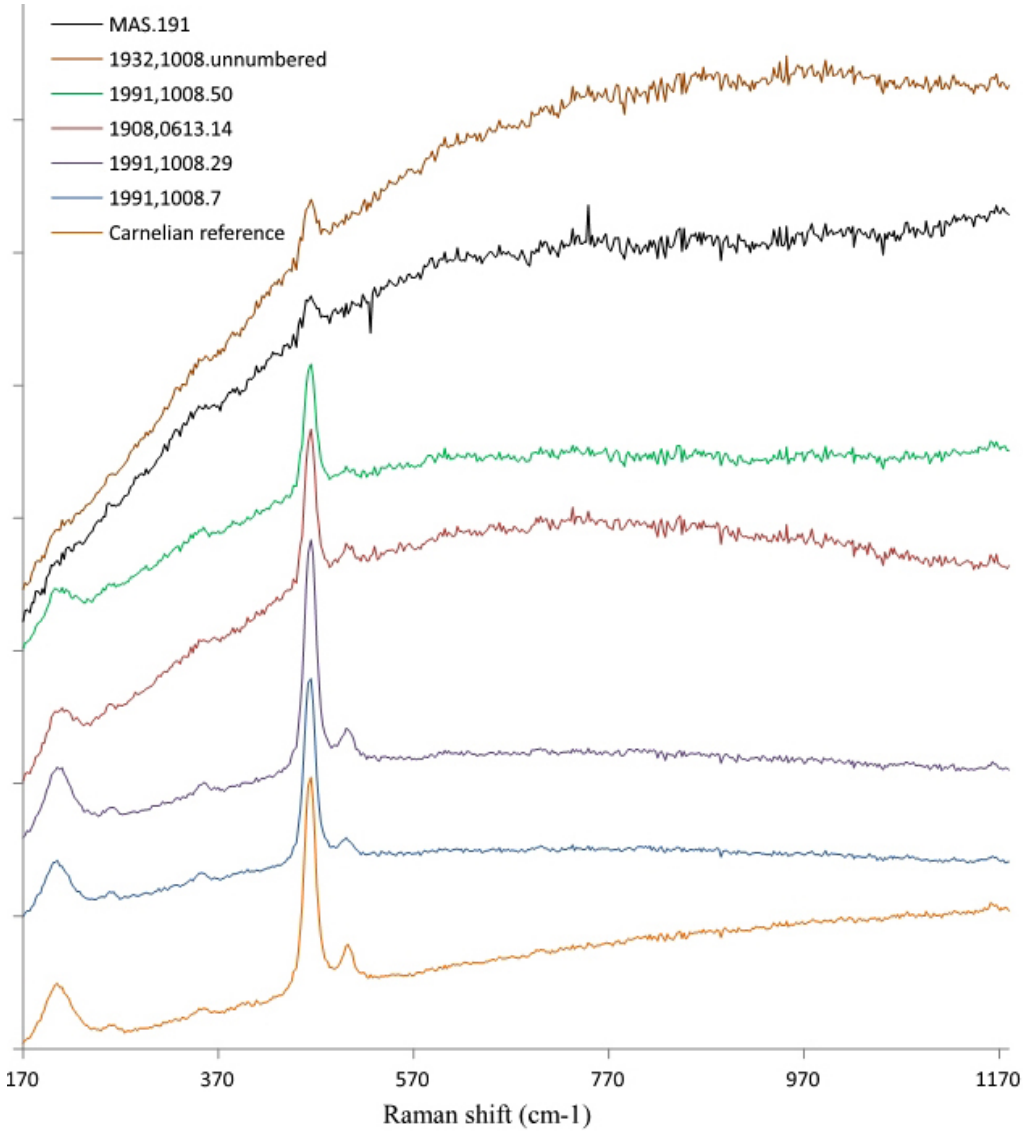


Figure 13. Raman spectra acquired on uncleaned surfaces of various archaeological beads from the British Museum collection

The oxides of sodium, magnesium, aluminium, calcium, sulphur, potassium and iron show relatively higher concentrations in etched areas than in unetched ones. Standard deviations may seem very high but the different conditions of the beads degradation explain these differences, and the important result is the trend observed on each bead. The etching medium is mentioned to only contain washing soda or sodium carbonate,[54] so an increase in sodium oxide might have been expected in the EDX composition of etched areas. The composition of washing soda powder identified by XRD was mostly carbonates, silicates, hydroxides and phosphates of sodium, calcium, magnesium and potassium. A slight increase in these oxides might therefore have also been expected in the EDX results. The increase in sulphur and aluminium oxides is however more surprising and may come from post-depositional phenomena during burial.

Invasive study

Because of the mitigated results of the non-invasive analyses, an archaeological bead was sampled in order to remove the potential influence of post-depositional materials and degradation products.[55] SEM-EDX analysis of the cross-section showed different results from the surface analyses. SE images of the unmounted and unpolished part of the freshly cut bead acquired in VP mode showed that the texture of the cut etched area was different from that of the plain cut carnelian (Figure 14). This difference may be structural only, because BSE images of both areas display a very similar shade of grey.

The elemental analyses carried out on the polished cross-section of the sampled archaeological bead were unable to quantify sodium, potassium, aluminium, sulphur or

[54] Mackay 1933; Majumdar 1934; Kenoyer 2017.

[55] BM 1991,1008.29.

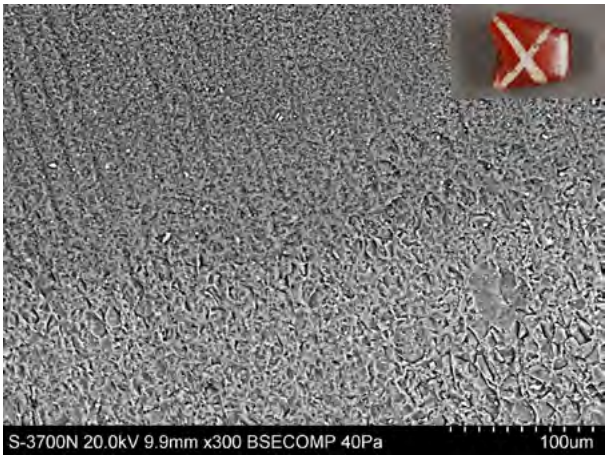


Figure 14. SE image of the unpolished cross-section of a bead: (top: etched area, bottom: plain carnelian (The British Museum, inv. nr. 1991,1008.29)

magnesium in either the etched or unetched area. This indicates that the surface analysis carried out previously probably mainly showed post-depositional elements. However, the different calcium contents between the etched and unetched area was still detected. Linear scans of the etched area showed that the concentration of all the elements, except calcium, was low and rather homogeneous. The calcium profile was also low and homogeneous overall, but showed small areas or spots with relatively higher concentrations (*c.* 3–4 times) in the etched area. An elemental map of the etched area confirmed that calcium oxide was indeed very locally concentrated in the intermediate porous zone of the etched area (Figure 15). It is however absent closer to the surface, where the porosity is higher. The map also showed relatively lower silica and higher oxygen contents in the latter area. Complementary imaging at higher magnification of this cross-section using a Hitachi FEG S-4800 SEM showed that the calcium-rich areas were actually not inclusions trapped in the pores, rather grains, inherently part of the crystalline microstructure (Figure 16). EDX analyses carried out on the calcium-rich grains identified correlated higher oxide concentrations of calcium and phosphorus. SEM-EDX analyses of wider areas also detected the presence of sodium in the etched area only.

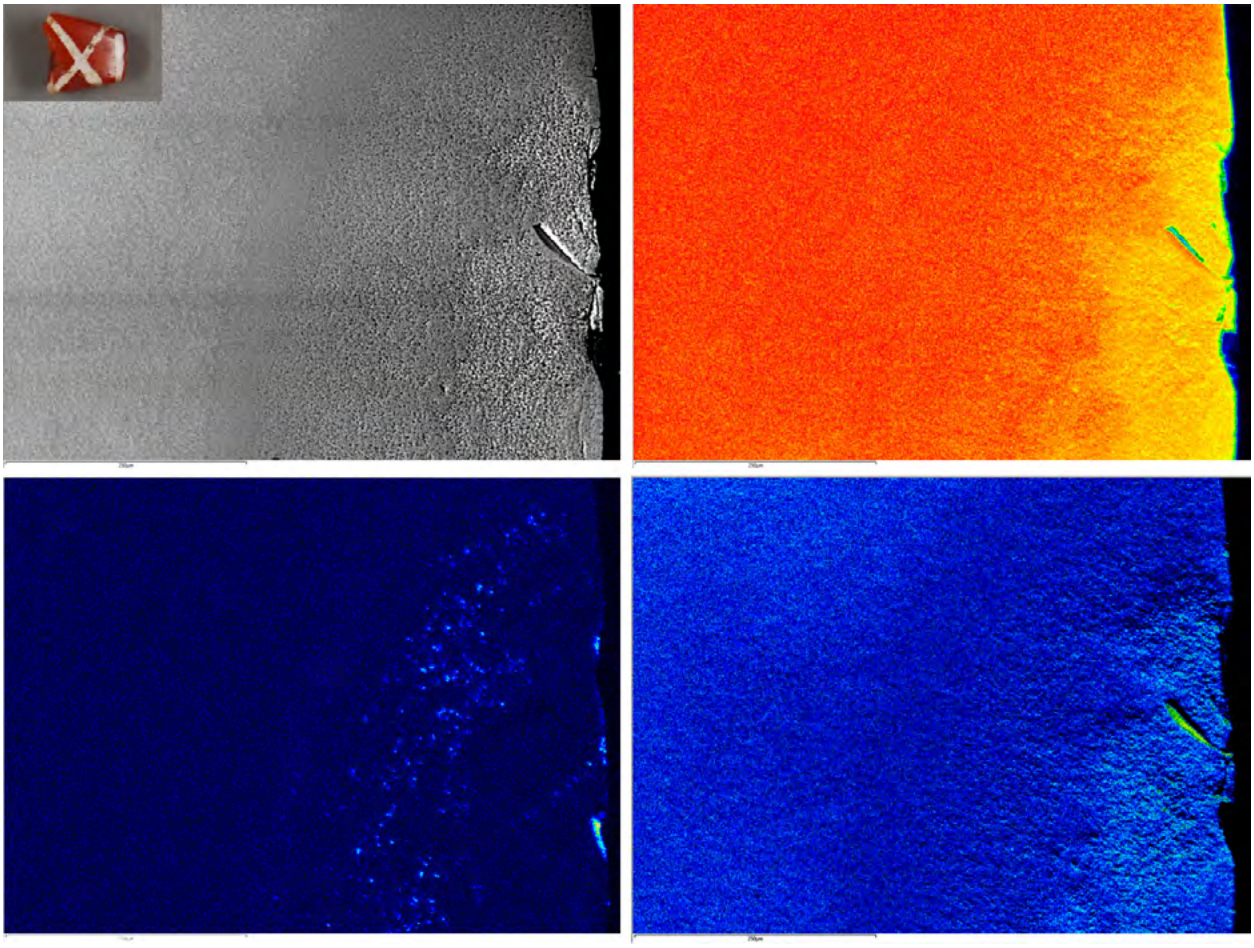


Figure 15. Elemental maps of an etched area of bead: SE image of the mapped area (top left), compositional maps for silicon (Si, top right), calcium (Ca, bottom left) and oxygen (O, bottom right); width of view: c. 0.6 mm); on each map, the brighter the colour, the higher the elemental concentration (The British Museum, inv. nr. 1991,1008.29)

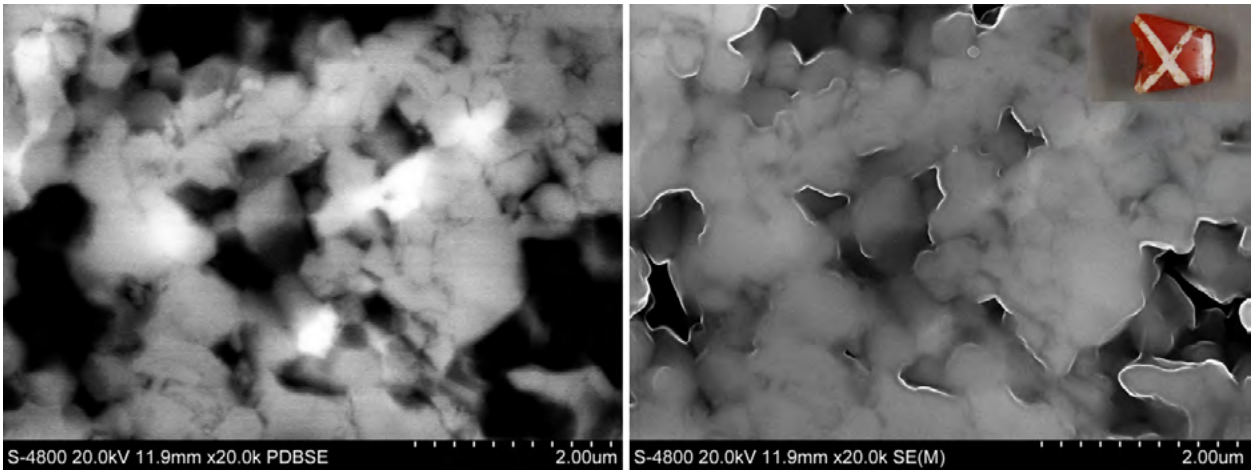


Figure 16. High-resolution and high-magnification BSE (left) and SE (right) images of the calcium-rich grains observed in the microstructure of the etched areas of of the sampled archaeological bead (The British Museum, inv. nr. 1991,1008.29)

Figure 17. BSE image of the polished cross-section of the sampled archaeological bead showing pores in the etched area, increasing in number and size closer to the surface, and numerous cracks (The British Museum, inv. nr. 1991,1008.29)

The chemical analyses have confirmed that the etched area is mostly made of crystalline silica, as already suggested by XRD and Raman. The data have also shown that there are only subtle compositional differences between both etched and unetched areas. This minor chemical change in the etched area is however correlated to a clear physical change. As shown above, SEM imaging of the cross-section has indeed revealed that the etched area was much more porous and displayed micrometric cracks parallel and close to the surface (Figures 10, 17). Numerous small pores have also been reported by Tite on the cross-section of another etched carnelian bead.[56] The porosity appears as a gradient from the core of the stone to an area with a sudden higher porosity closer to the surface (Figure 10). The two etched areas on this bead show different thicknesses, from *c.* 250 micron for one to *c.* 400 micron for the other. They look similar to those resulting from shrinkage of the clay matrix of a ceramic during firing.

Laboratory experiments

Selection of the organic 'sticky medium'

The reproduction of the etching paste was carried out by first identifying an adequate organic 'sticky medium' to replace the bush juice unavailable for the experiments, and then mixing them with different solutions of washing soda to obtain a paste that matches Mackay's approximate description.[57] A good 'sticky medium' is a material viscous enough to prevent the paste from flowing if applied on curved surfaces of beads, but fluid enough so that it can still be applied with care and precision. It should not dry too quickly either, to give enough time to the drawing of complex patterns.

Five natural compounds were selected and tested, with the idea to be as close to the bush juice as possible. As mentioned above, these included starch, gum Arabic, sodium alginate, natural hard resin and buckwheat honey. Different concentrations of aqueous solutions of starch, gum Arabic and sodium alginate were prepared and the results are given in Table 1 below. Four media were identified as suitable for paste making as having the right combined viscosity and drying time: two sodium alginate solutions and one starch solution with low concentrations and buckwheat honey. Following the results shown in Table 1, it was decided to prepare two sodium alginate solutions at 0.1 g/ml and 0.15 g/ml and a starch solution at 0.2 g/ml. These four media were then individually mixed with alkaline solutions of laboratory-grade sodium carbonate and of commercially available washing soda.

[56] Tite 1986.

[57] Mackay 1933.

Composition		Aspect		
Sticky medium	**Concentration (g/mL)**	**Stickiness (cm/min)**	**Colour**	**Texture**
Sodium alginate	0,4	0	Light yellow	Solid gelatin Impossible to paint with
Sodium alginate	0,1	0	Pale yellow	Thick and gelatinous paste Good candidate to paint with
Sodium alginate	0,05	0	Translucent yellow	Liquidish gel Good candidate to paint with
Starch	0,4	0	Translucent white	Sticky and viscous liquid Dries too fast to paint with
Starch	0,3	0	Translucent white	Sticky and viscous liquid Dries too fast to paint with
Starch	0,2	0	Transparent	Slightly viscous liquid Good candidate to paint with
Gum Arabic (ref collection)	0,4	4,2	Brownish	Sticky liquid Not sticky enough
Gum Arabic (ref collection)	0,2	7,3	Brownish	Sticky liquid Not sticky enough
Gum Arabic (Daler-Rowney)	/	1,1	Brownish	Sticky and viscous liquid Not sticky enough
Buckwheat Honey	/	0	Brown	Between set and liquid honey Good candidate to paint with
Natural hard resin	/	0	Amber	Solid at room temperature/too sticky melted Impossible to paint with

Table 1. First stage of the experiment, testing the various sticky media

Manufacture of the etching agent

No concentration for the washing soda solution was given by Mackay, so solutions of 0.1 g/ml of washing soda or sodium carbonate were initially chosen to make the etching pastes.[58] However, Majumdar explains that 'half a chhatak of washing soda is dissolved in two tolas of water'.[59] The conversion of chhatak and tolas in the international unit system gives a mixture of 30 g of washing soda in 24 g of water, thus a concentration of 1.25 g/ml. This concentration was therefore used for all the pastes produced with washing soda. In the case of sodium carbonate, a saturated solution was assessed instead, as a concentration of 1.25 g/ml resulted in a semi-solid agglomerate rather than a liquid solution. No soda solution-'sticky medium' ratios were given either by Mackay or Majumdar. Three different ratios were therefore arbitrarily chosen following Mackay's description of a 'small quantity':[60] 0.5 ml, 1 ml and 2 ml of washing soda or sodium carbonate solution in 5 ml of 'sticky medium'.

The pH of all the etching pastes was alkaline and measured around 12-13. On one hand, the pastes produced by mixing the sodium alginate solutions at 0.1 and 0.15 g/ml with alkaline solutions at 1.25 g/ml in 5:1 and 10:1 ratios gave the best results in terms of qualitative 'stickiness'. All pastes were still transparent after drying on the surface of the carnelian samples and less runny; all displayed a smoother and more adhesive texture when dry than the blank paste obtained with the washing soda solution alone. On the other hand, the starch solution mixed with the alkaline solutions completely lost its physical properties and the mixture became very runny during preliminary tests on a glass panel. This phenomenon may be explained by the fact that starch molecules are partially degraded at alkaline pH.[61] Buckwheat honey also became much runnier when mixed with the washing soda solution. Additionally, honey did not dry properly on the glass panel and remained sticky, even after three days. The layer also remained of the same yellowish colour and did not whiten. From these results, only four etching pastes composed of sodium alginate at either 0.1 g/ ml or 0.15 g/ ml mixed with washing soda at 1.25 g/ml in 5:1 or 10:1 ratio were further studied. Etching pastes composed of saturated laboratory-grade sodium carbonate solution and sodium alginate were also applied on several samples to check whether the additives of washing soda had any influence on the final result.

As intended, the physical properties of the four selected pastes appeared closest to the one described

[58] Mackay 1933.
[59] Majumdar 1934.
[60] Mackay 1933.
[61] Lee, Han and Lim 2009.

by Mackay.[62] They were therefore applied onto polished and unpolished flat surfaces of modern carnelian beads with a wooden toothpick in the shape of two dots and one curved line. The carnelian beads on which the pastes were applied had very different colours, ranging from pale orange to dark red and from homogeneous throughout to much lighter in the centre than the edges. Two control samples were also tested, respectively composed of sodium alginate solution at 0.1 g/ml only and washing soda at 1.25 g/ml only.

The drying times of the etching pastes ranged between about 30 minutes and an hour for the sodium alginate-based pastes at 0.1 g/ml, to about 1 hour or over for the sodium alginate-based pastes at 0.15 g/ml. However, the variation in paste thickness may have greatly influenced this drying time and inferred relative inaccuracy in these estimations.

Firing

The carnelian beads with dried etching pastes were fired under different conditions of temperatures and durations to study their respective influence on the etching process. Three types of control samples were fired along the test samples: these included one blank modern carnelian and the two control samples mentioned above (sodium alginate solution at 0.1 g/ml only and soda solution at 1.25 g/ml only).

Fired blank carnelian samples shattered at the relatively high temperatures of 800°C and 1000°C, confirming the impossibility of forming a low-melting glass to create the etched patterns. Quartz undergoes a phase transition at 573°C at atmospheric pressure, which may explain the stone fracturing above this temperature; it was therefore decided to fire test samples at temperatures below to avoid damaging the stone. Two firings at 500°C for 5 and 30 minutes were successful in etching carnelian but still fractured or shattered the stone, while one firing at 400°C for five minutes burnt the paste but did not result in the stone being etched. Three firings at 450°C for 5, 15 and 30 minutes resulted in successful etching of unpolished samples of carnelian, indicating that the operating temperature was in the right range. The longest duration, however, also led to the fracturing of the stone.

The control sample with only washing soda was completely unetched: the crumbly washing soda was only sitting on the surface and did not seem to adhere to or interact with it. The organic medium, in addition to its physical 'sticky' properties, appears to help in distributing the washing soda homogeneously in the etching agent, achieve a closer adherence of the etching agent to the stone and therefore potentially improve its penetration. The sample with a 10:1 ratio washing soda (1.25 g/ml)/sodium alginate (0.1 g/ml) paste was also unetched and the paste had only burnt, resulting in black matter sitting on the surface, unlike the sample with a 5:1 ratio paste, which was well etched. These experimental firings have shown that etching successfully takes place on undamaged carnelian using an etching agent with a higher proportion of alkali in the paste, at temperatures around 450°C and for about 5–15 minutes.

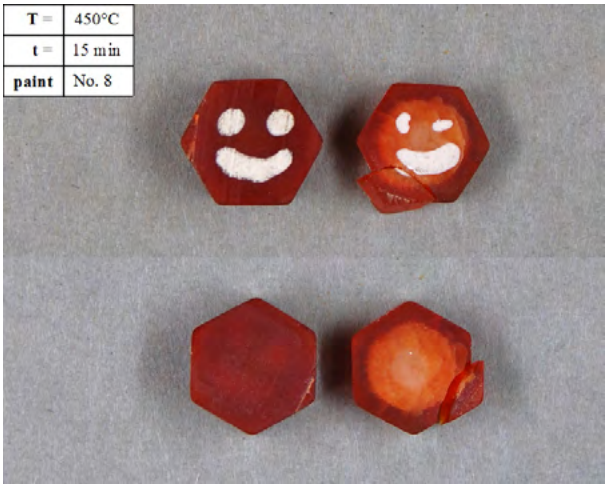


Figure 18. Carnelian beads fired at 450°C for 15 minutes: one non-fractured homogeneously coloured bead (left) and one partially broken bead with a lighter-coloured centre (right)

The inherent quality of the carnelian stone is an important factor influencing its potential fracturing during firing: two samples decorated with the same paste were fired at 450°C for 15 minutes with the only difference being the colour of the carnelian. The sample with a homogeneous colour did not fracture during the firing, while the one with a lighter centre did (Figure 18). At the same time, samples decorated with a paste containing laboratory-grade sodium carbonate instead of commercial washing soda were fired to document whether the various additives contained in washing soda played a role in the etching process. These fired samples were well etched, suggesting that sodium carbonate is the main chemical responsible for etching.

Imaging and analysis of experimental samples

All samples were examined using digital microscopy to record their features and some of them were selected to be studied in the SEM. A few samples that featured a microscopic non-porous surface layer were also selected for Raman analysis. Small fractures, similar to the ones identified on several archaeological beads, were noticed at the interface between the plain carnelian and the white designs (Figures 11, 19). This suggests that these

[62] Mackay 1933.

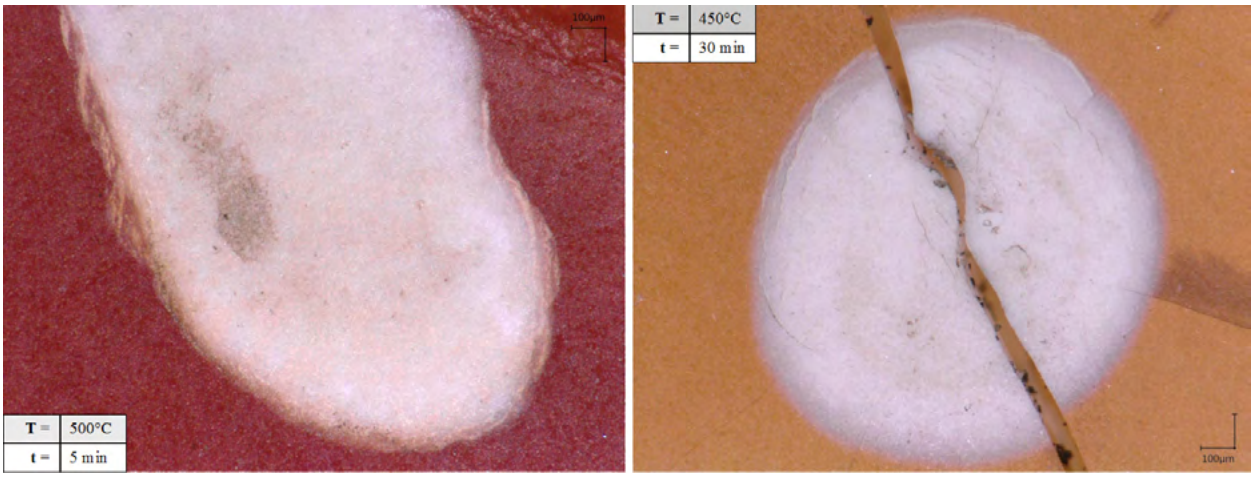


Figure 19. Micrometric fractures at the interface between the etched and unetched areas on two different experimental samples (scale 0.1 mm)

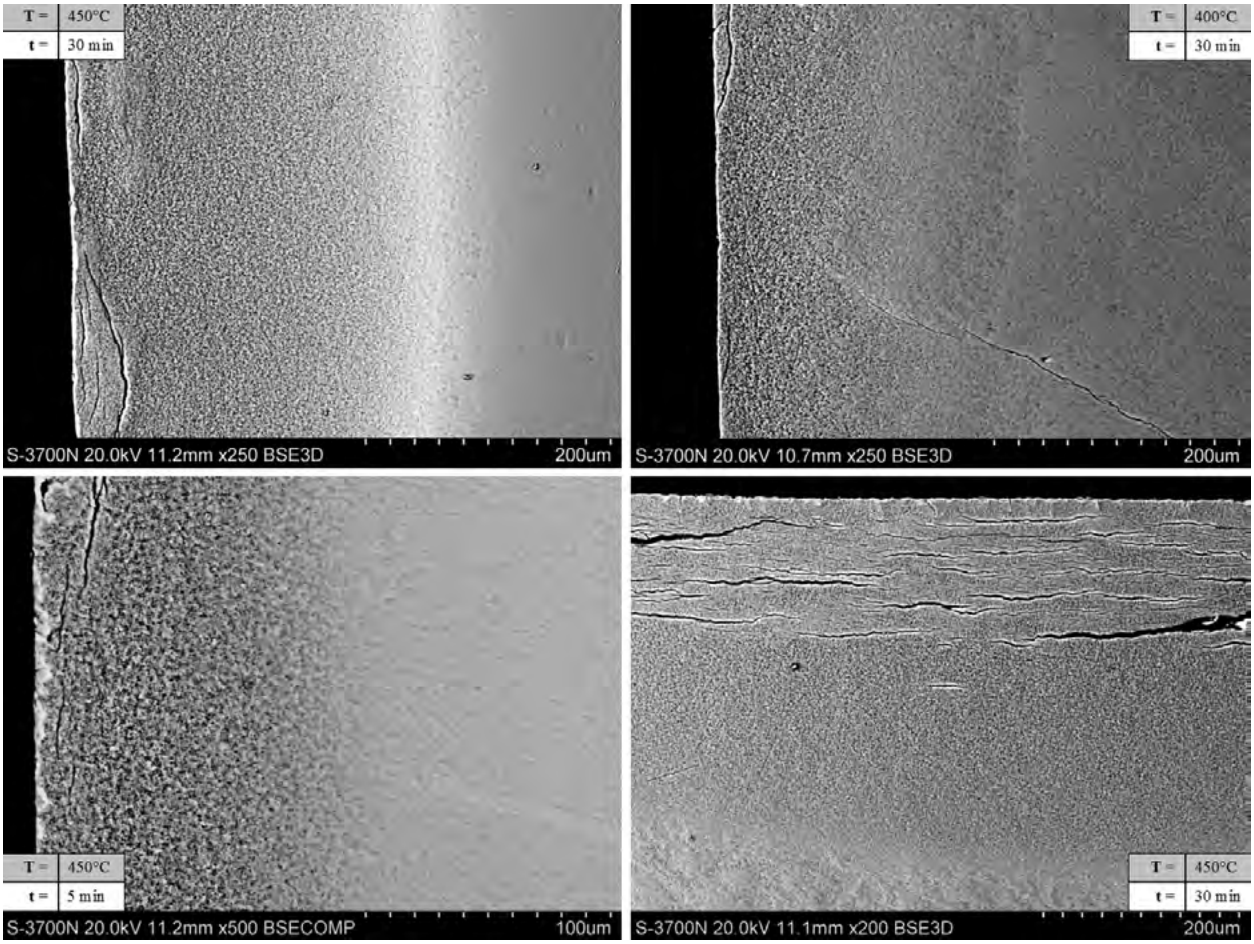


Figure 20. BSE images of experimentally etched areas with an etching paste made of sodium alginate (0.1 g/ml)/washing soda (1.25 g/ml) in 5:1 ratio (top left, top right and bottom left) and made of sodium alginate (0.15 g/ml)/washing soda (1.25 g/ml) in 5:1 ratio (bottom right)

tiny fractures were created during the etching process and less likely during the degradation of the bead in the burial environment. Their number and size also seem to increase with the firing temperature, as they are not apparent on samples successfully etched at lower temperatures.

SEM images of etched areas of experimentally etched samples showed a similar porous structure with micrometric fractures parallel to the surface to the one noticed on the polished cross-section of the archaeological bead. On average, the depth of the etched areas seems to increase with the temperature

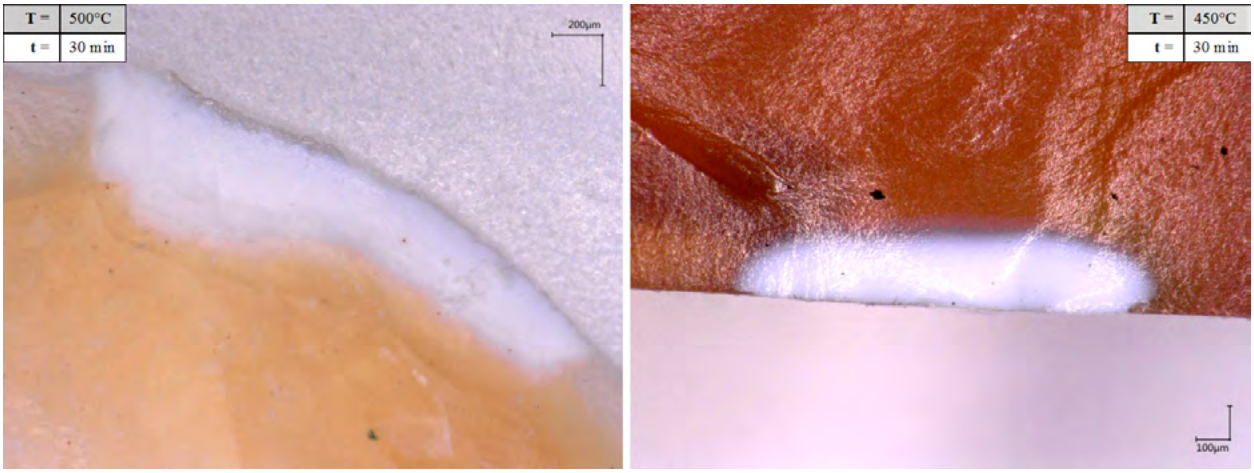


Figure 21. Photomicrographs of the thin non-porous transparent surface layer covering etched areas (scales: left 0.2 mm; right 0.1 mm)

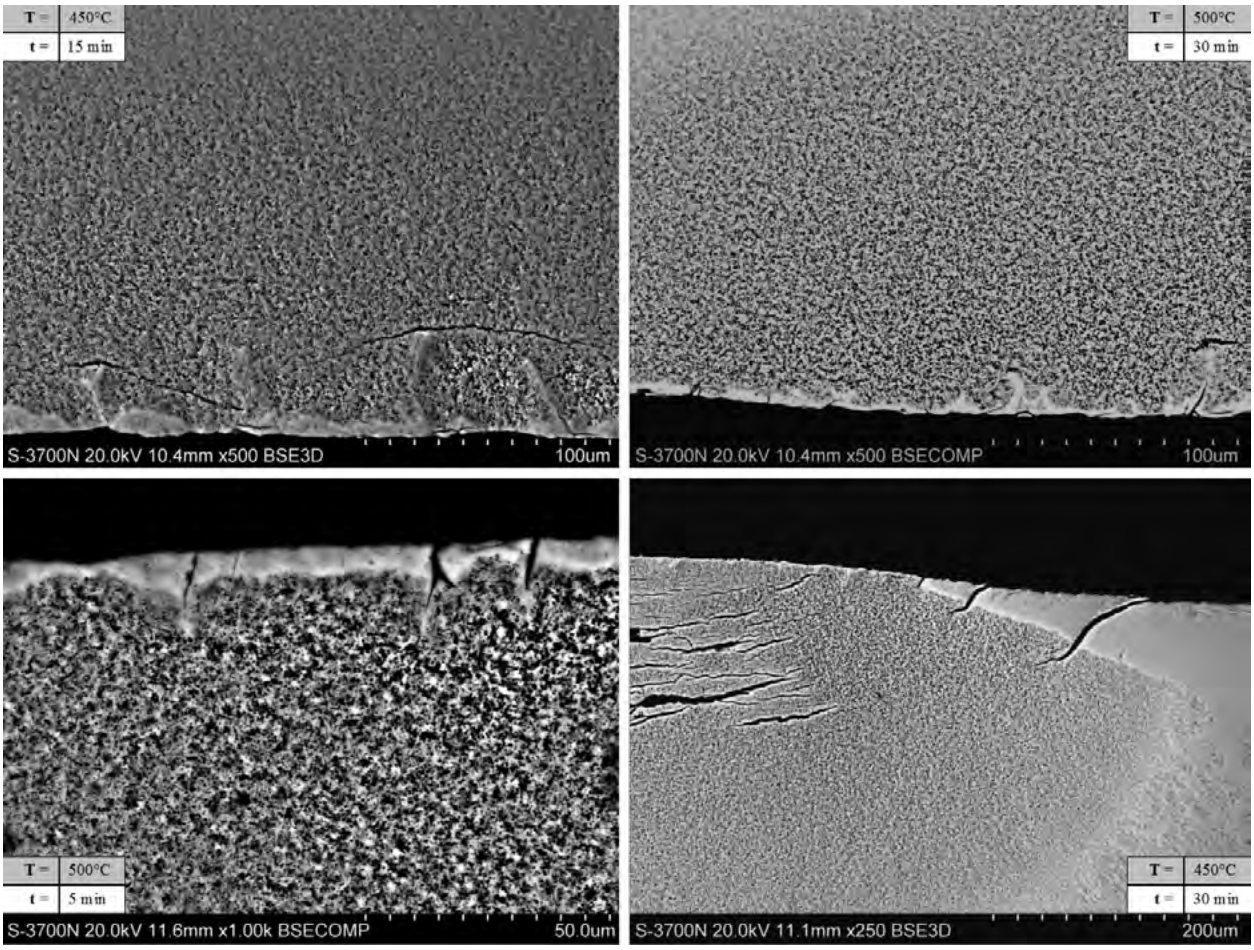


Figure 22. BSE images of transparent surface layers covering etched areas

and the duration of the firing (Figure 20). A similar although less prominent pattern can be noticed for the number of micrometric fractures in the etched area.

The pastes containing a more concentrated organic 'sticky medium' (0.15 g/ml) seem to penetrate deeper in the stone and generate more fractures: one firing at 500°C resulted in an etched area *c.* 410 microns deep with the etching paste made of sodium alginate (0.1 g/ml)/washing soda (1.25 g/ml) in a 5:1 ratio and *c.* 470 microns deep with the etching paste made of sodium alginate (0.15 g/ml)/washing soda (1.25 g/ml) in a 5:1 ratio (Figure 20: top left, bottom right). A more concentrated sodium alginate solution produced a thicker paste and may have therefore resulted in a

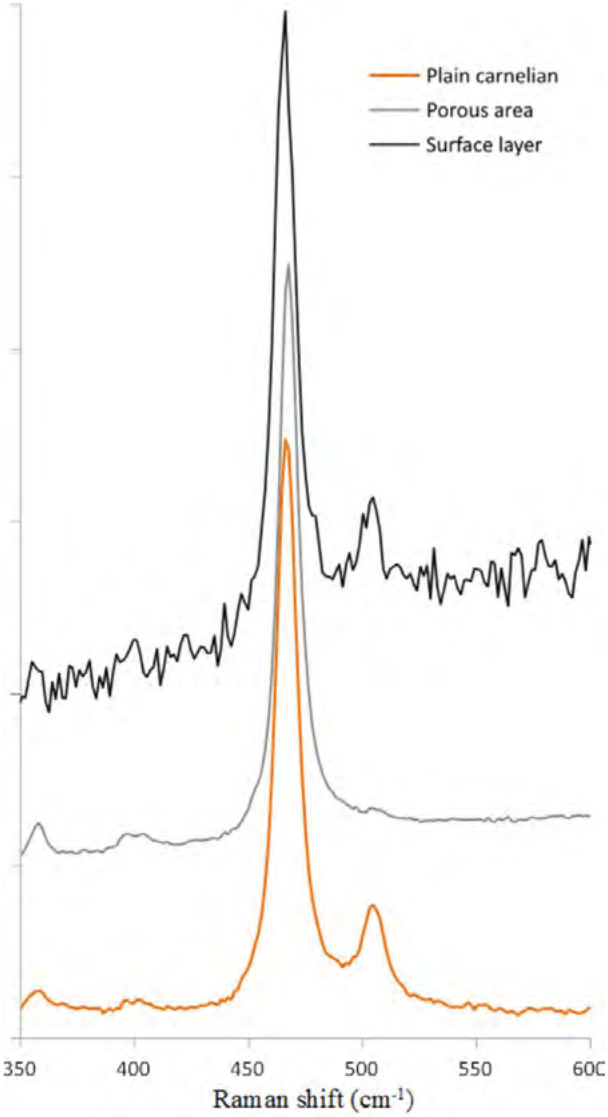


Figure 23. Raman spectra of the plain carnelian, the porous etched area and the non-porous surface layer showing the peaks attributed to the phases of moganite and quartz

thicker layer applied on the carnelian and, possibly, more paste having penetrated into the stone.

The surface of etched areas appears to be covered by a very thin non-porous transparent layer, which looks glassy microscopically (Figures 21, 22). This surface layer is *c.* 5-10 microns thick and becomes thicker near the edges of the etched areas, where it blends with the stone (Figure 22: bottom right). This layer is not visible or very thin on experimental samples fired at lower temperatures. SEM-EDX and Raman analyses showed that it is composed of quartz. Interestingly, the porosity decreases closer to the fractures parallel to the surface, in a similar way to this surface layer (Figure 20). Such a layer was however absent from the cross-section on the archaeological bead, which only had a slight decrease in porosity at the surface. Raman analysis further showed that the intensity of the main peak at 503 cm^{-1} attributed to moganite was lower for the porous area than for the surface layer and the plain stone (Figure 23).

Discussion

The manufacture of carnelian bead involves a complex *chaîne opératoire*, which requires a variety of technical and artistic skills. The whole technological sequence to produce carnelian beads starts with the mining of the semi-precious stone, followed by the chipping and cutting to shape and rough polishing. One further crucial step is the drilling of the bead, which is carried out from both sides.[63] This explains why several beads show a mis-alignment towards the middle of their perforation, in the place where the two drills have met (Figure 5). A few with failed perforations have also been reported.[64] A great variety of drills has been used to perforate the beads,[65] but the prevalent type in the more recent times is the diamond-tipped drill.[66] This step appears to generally take place towards the end of the technical sequence.[67] The last step is probably the polishing, as it is rather delicate and enhances the final aspect of the stone. It seems relatively straightforward for smaller beads, but can become problematic for longer beads.[68] However, their value is high enough to be either repaired or recycled as smaller beads if broken.[69]

As discussed in this scientific pilot study, an additional step can be added to create patterns on the beads and achieved by etching. Etched beads are more rarely found in the archaeological record,[70] which may be due to the etching process requiring a very specific know-how, possibly restricted to a few local craftsmen only.[71] Kenoyer argues that this process he refers to as bleaching is one of the latest steps in the *chaîne opératoire,*[72] and may happen after drilling. This appears to be confirmed by the design on the side of several beads, which appears intentionally interrupted a few millimetres either side of the central perforation and by the pattern on one bead which is not cut by the perforation (Figure 24, right).[73] Additionally, a deep mark on the surface of another bead is the result of a perforation begun but stopped before completion near the complete hole, which is in the middle of the etched design (Figure 24, left).[74] The relocation of the perforation may be because of its mis-alignment with

[63] Roux and Matarasso 1999; Prabhakar 2016.
[64] Mackay 1937,
[65] Mackay 1937; Kenoyer 2005; Prabhakar 2016.
[66] Roux and Matarasso 1999; Prabhakar 2016.
[67] Roux and Matarasso 1999; Prabhakar 2016.
[68] Mackay 1937.
[69] Mackay 1937.
[70] Inizan 1999.
[71] Mackay 1933.
[72] Kenoyer 2005.
[73] BM M.A.S.152.
[74] BM 1991,1008.13.

Figure 24. Photomicrographs of a deep mark left by the interrupted drilling of the threading hole near the completed central perforation (left; scale 5 mm) and of an etched area close to but not cut through by the drilled perforation (right; scale 0.1 mm)

the other half-drilled hole or the absence of the etched design, which would have helped the alignment and symmetry. This may perhaps suggest that this bead was drilled before being etched. From a practical point of view, etching beads after drilling seems more logical, since, on the one hand, it would help the pattern to be symmetrical around the threading perforations and, on the other hand, drilling may result in a broken bead, which would make any time invested in etching worthless.

Although polishing has also been documented as one of the last steps in the *chaîne opératoire*,[75] experimental etching on polished surfaces of modern carnelian beads was almost completely unsuccessful, especially when compared to those on unpolished surfaces. This evidence seems to confirm that the decoration and firing of the beads was done before their final polishing.

A further important parameter which appeared crucial to successfully obtain non-fractured carnelian beads after the firing was the quality of the raw carnelian stone. Carnelian beads with a homogeneous red colour were less likely to crack during the firing than those with a heterogeneous colour, i.e. red to dark red on the outside and off-white in the core (Figure 18). The experiments also emphasised the importance of the organic 'sticky medium' in the process, as it was initially believed to only help with the texture to prevent any bleeding while drawing the patterns to be etched.[76] Experimental cross-sections have however shown that a pure washing soda solution was unable to etch carnelian under 500°C, at or over which temperature most samples fractured or shattered. On the other hand, etching pastes prepared by mixing a washing soda solution with an organic 'sticky medium' were able to etch carnelian beads at lower temperatures.

The depth of the porous etched area seemed to increase with the concentration of sodium alginate. A more concentrated sodium alginate solution however generally produced a thicker layer applied on the stone, so this observation may also probably result from the different thicknesses of paste films. The exact role of the organic 'sticky medium' and the interaction of washing soda in that medium are not fully understood yet and further investigation is needed. Another limitation to our interpretation lies in the fact that the organic medium used for this set of experiments was sodium alginate instead of the ethnographically documented *Capparis aphylla* juice. Successful etching with a relevant substitute, such as sodium alginate, however shows that the production of etched beads would not have been limited to geographical areas where *Capparis aphylla* grows. It has been suggested on archaeological grounds that etching may have taken place not only in the Indus Valley, but also in Oman[77] or Iran[78] for instance. *Capparis aphylla* does grow in Iran and in the Indus Valley but it does not grow in Oman. The production of etched beads in the latter would have thus required either import of *Capparis aphylla* or the use of another organic medium.

Besides, the action of the etching agent on the stone seems physically and chemically complex. Although etched areas optically appear very different from the plain carnelian, which is why the various motifs are visible on the stones, the chemical composition of the two areas has been shown to be very similar using SEM-EDX, XRD and Raman, which all gave the characteristic signals for quartz. This may be due to the carnelian matrix being mostly composed of microcrystalline quartz and reducing the signal of minor elements to close or below detection limits of the analytical instruments available for this study.

[75] Roux and Matarasso 1999; Kenoyer 2005.
[76] Mackay 1933.
[77] Reade 1979.
[78] Simpson 2003*a*.

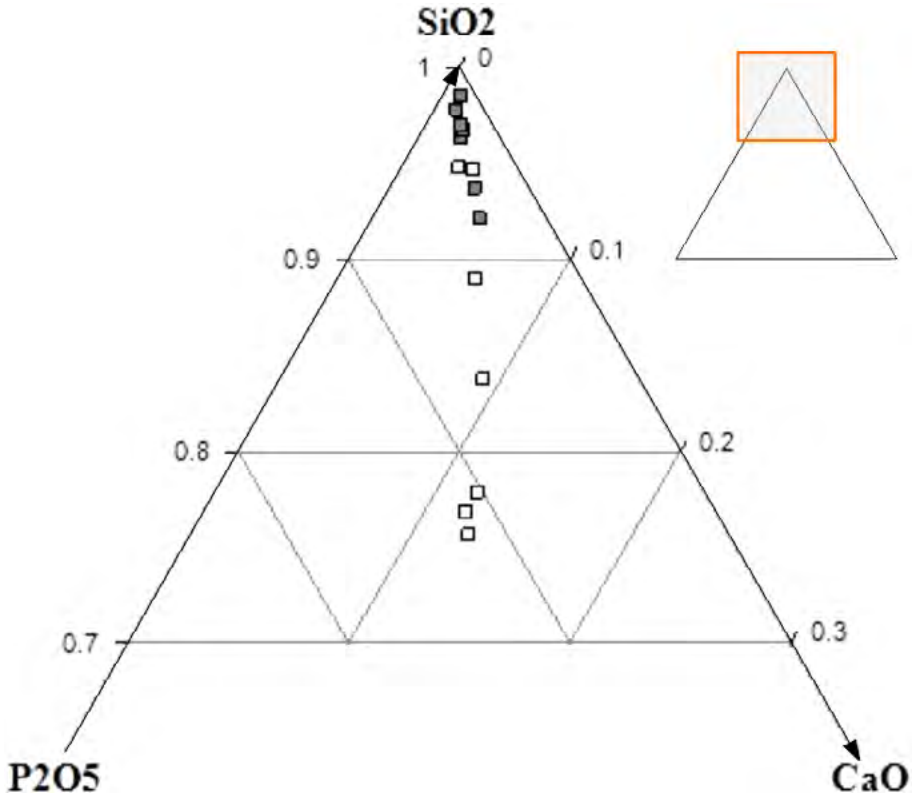


Figure 25. Ternary diagram of the SEM-EDX compositional analyses of calcium, silicon and phosphorus oxides in calcium- and phosphorus-rich grains (white squares) and in other grains (grey squares)

The conchoidal weathering marks being the same on both etched and unetched areas suggested a similar degradation process, regardless of whether or not the area was etched and therefore confirms the similarity in chemical composition between the two areas.

The elemental mapping and linear scans of the cross-section of the archaeological bead showed small calcium- and phosphorus-rich grains. These grains are inherently part of the crystalline structure, instead of inclusions trapped in the pores (Figure 16), which suggests that they are not associated with post-depositional material coming from the burial environment. This was already hinted at through the calcium-rich grains being only present in the middle of the etched area and not close to the surface. EDX analyses of these grains showed a correlation between the calcium and phosphorus concentrations (Figure 25), which may suggest that one specific compound is present in different concentrations in each grain. The small quantity of sodium oxide detected by SEM-EDX in the etched area of the archaeological bead is similar to those of the experimentally etched carnelian samples, suggesting that the sodium oxide comes from the alkali. No calcium- and phosphorus-rich grains were however identified in the experimental samples. This may suggest that ancient recipes of etching agent contained more calcium- and phosphorus-rich compounds than the modern washing soda. Correlated phosphorus and calcium oxides are typical of bone ash and may otherwise indicate the use of bones as fuel for the fire. Finally, cow dung, which was also used as fuel in the Indus valley,[79] is also rich in phosphorus and might, with a calcium-rich alkali, alternatively explain the composition of these grains. Further investigation, especially field experiments using cow dung or bones as fuel, needs to be carried out to confirm either of these hypotheses.

However, the different visual appearance of the etched areas is probably mostly due to the clear physical change in the stone. The etched areas certainly appear porous and show cracks parallel to the surface of the stone. This network of pores is most likely responsible for scattering the light in a different way from the undisturbed stone structure, causing the etched area to optically look white.[80] These pores are probably resulting from the dissolution of silica grains, starting preferentially at the boundaries of the microcrystalline quartz grains,[81] which seems to be confirmed by high-resolution and high-magnification SE images (Figure 26). The smoother grain surfaces observed on the archaeological bead compared to the experimental cross-sections may come from the degradation of the former during burial. This network of fine pores possibly explains the higher oxide concentrations detected on the surface of etched areas in the non-invasive study, as their more porous and fibrous structure would have facilitated the movement of ions within the crystal structure and trapped the diverse

[79] Paul Craddock, personal communication.
[80] Tite 1986.
[81] Tite 1986.

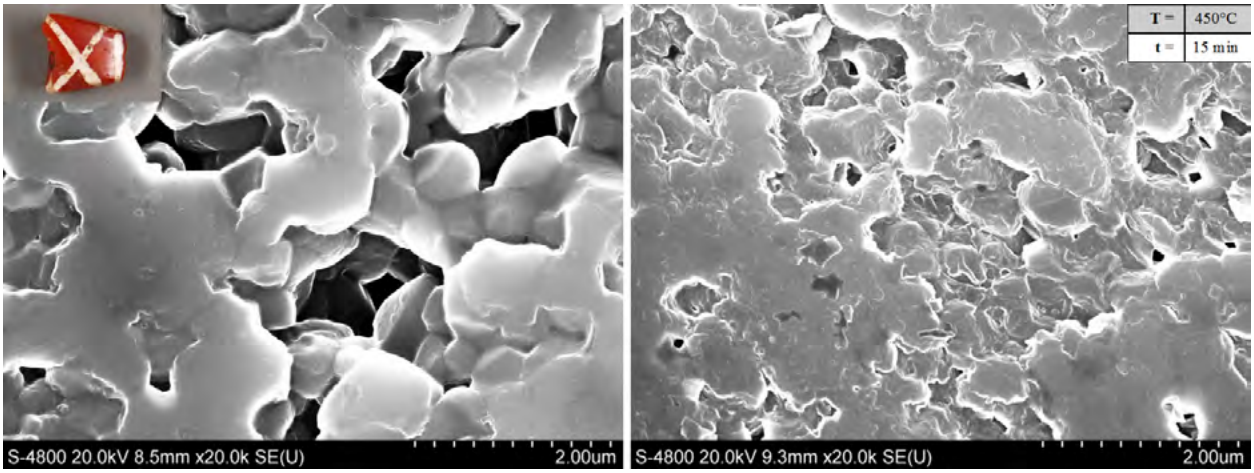


Figure 26. High-magnification SE images of the porous etched areas of an archaeological bead (The British Museum, inv. nr. 1991,1008.29; left) and an experimental modern sample (right)

oxides. This also corroborates the hypothesis that these relatively higher concentrations of minor oxides were mainly from post depositional material.

Haematite being responsible for the red colour of the carnelian, it is likely that the white etched areas have seen a chemical change related to iron oxide, either in the form of a loss and/or change in the oxidation state of iron. Iron oxide was however in such small concentrations that it was not possible to accurately quantify it. More sensitive techniques dedicated either to the quantification of trace elements or molecular analysis could help in assessing this potential phenomenon.

The thin non-porous and homogeneous surface layer on top of etched areas, which looks transparent under the microscope, has a 'glassy' aspect, potentially enhanced by the polishing of the archaeological beads. This may explain why the etched patterns have been interpreted as a low-melting glass formed by the reaction between the silica of the stone and the alkali of the etching paste.[82] This surface layer is however composed of crystalline quartz. Tite suggested that the decrease in porosity nearer the surface was 'due to compaction as a result of polishing the surface subsequent to etching'.[83] However, this may not be the main reason because this non-porous surface layer was visible on the experimentally etched carnelian beads and these were not polished after being etched. This layer might more likely be due to redeposited silica on the surface of the bead after its dissolution by the alkali.[84] No such surface layer was visible on the cross-section of the archaeological bead, possibly because it had degraded away. It has also been noticed that the layer follows the cracks, which penetrates from the surface into the stone and that the porosity slightly decreases near these cracks inside the etched area. This may suggest that the silica dissolved by the alkali needs an oxidising atmosphere to be redeposited, since the fractures may help oxygen to diffuse more easily into the stone.

On several samples, the intensity of the main Raman peak at 464 cm^{-1} attributed to quartz is about 5 to 6 times higher than the main peak at 503 cm^{-1} attributed to moganite in the plain carnelian and the surface layer, while it increases to about 28 times on average for etched porous areas (Figure 23). Although further Raman analysis would be needed to statistically confirm this trend, the chalcedony/moganite ratio seems to suggest a more substantial decrease in moganite than in chalcedony in etched areas. Moganite crystallises in a monoclinic structure[85] and quartz in a trigonal one.[86] Besides, moganite contains much more water in weight than chalcedony[87] and is mainly situated in the core of the grains.[88] During the drying step at the beginning of the bead manufacture process,[89] the water trapped in the stone vaporises and creates space in the crystalline structure: this may therefore leave more space in moganite-rich grains. This may infer that moganite-rich grains might be preferentially attacked and dissolved by the alkali contained in the etching paste, resulting in a preferential loss of moganite in the porous etched areas.

However, the intensity of the main Raman peak attributed to moganite in chalcedony, and thus carnelian, may overestimate the actual quantity of moganite in the stone. This is explained by the possible interference of moganite and silanol bands in this

[82] Glover and Bellina 2003.
[83] Tite 1986.
[84] N.D. Meek, personal communication.
[85] Kingma and Hemley 1994.
[86] Fondel 1962: 1.
[87] Graetsch, Topalovic and Gies 1994.
[88] Kayama *et al.* 2018.
[89] Roux and Matarasso 1999.

Raman shift range.[90] However, these published data were acquired on powdered samples, i.e. samples with a high surface/volume ratio, and thus with a high possibility to have silanol groups, whereas data were acquired directly on solid samples, i.e. with a smaller surface/volume ratio, in this study. Besides, the main Raman peak for moganite is weaker in the porous areas, where the surface/volume ratios are higher and therefore the probability of silanol group is too. This suggests that the peaks attributed to moganite in this study are probably not influenced too much by the silanol interference. This would require further investigation to be fully understood.

Conclusions

Etching carnelian beads for decorative purposes requires a specific know-how, which includes artistic skills to create designs, but also various technical skills to control and achieve a reliable and successful etching. The archaeological beads seem to indicate that, in the whole *chaîne opératoire*, etching took place after the threading perforation was drilled but before the final polishing.

The first step in the etching process involves the manufacture of the paste, whose texture should prevent it from flowing on the curved surfaces of spherical beads and also enable an easy and precise application. This paste is composed of an organic 'sticky medium', traditionally the juice of the *Capparis aphylla* but has been successfully substituted by sodium alginate in this study, mixed with a solution of washing soda. This indicates that etched carnelian beads can be made in other regions where *Capparis aphylla* is unavailable, if appropriate substitutes can be sourced and the etching technology understood and assimilated. The mixing ratio of organic medium to washing soda solution was optimal at 5:1. The second step is the firing of the decorated beads, traditionally carried out in an open fire with the bead placed in an open clay mould. The laboratory experiments found the optimal firing temperatures to be between 400°C and 500°C, as the white patterns did not appear at 400°C but the risk of the stone being shattered increased at 500°C, while firing at 450°C produced the best results. Optimal firing duration was estimated between 5 and 15 minutes, so a relatively short process, confirming Mackay's observations.[91]

Scientific investigation of both the archaeological artefacts and experimentally etched samples has revealed that the physical properties of the etched areas were very different from those of the plain carnelian, while their chemical composition were relatively similar. The main chemical difference lies in the presence of sodium oxide in etched areas of both the experimentally etched carnelian and the archaeological bead studied invasively and of calcium- and phosphorus rich-grains in those of the archaeological bead only. The increased porosity in the etched areas scatters the light and gives the etched areas their distinctive white colour, which is due to the dissolution of quartz, possibly preferentially near grains boundaries and/or in moganite-rich crystals. Laboratory experiments have further identified the formation of a transparent surface layer composed of crystalline silica, which gives the etched areas an overall glassy appearance.

This study has highlighted some remarkable features of etched carnelian beads and of the technological process involved in their manufacture. Several questions remain unanswered and new ones have been raised, which would require further investigation to have a complete understanding of the etching process. A more detailed and combined study of style and technology of other features of the beads may help narrow down some possible time-periods and places of origin. In particular, the study of the drilling technique could provide more information about the period related to the type of drill used and potentially the geographical area. The provenance of the raw carnelian could also provide hints about the production place of the beads: carnelian sources are known in central Asia, Iran, the Caucasus and Yemen as well as India. From an experimental point of view, the next logical steps would be to use the traditional juice of the *Capparis aphylla* and different types of fires, such as an open charcoal hearth in the ground with a variety of fuels, and respectively investigate their influence on the texture of the etching paste and the firing conditions. The etching mechanism could also be understood more thoroughly by studying the interactions between the surface of the stone and the dried etching agent at a molecular level.

[90] Schmidt *et al.* 2012; 2013.
[91] Mackay 1933.

Trade, community and labour in the Pontic Iron Age forest-steppe region, *c.* 700–200 BC

James A. Johnson[1]

Abstract

The Pontic Iron Age is characterised primarily by the arrival of nomadic pastoral groups, conventionally known as the Scythians. Much of the archaeological and historical research done on these groups focuses on burial rites and social structure, information gleaned from the deposition in burials of large quantities of gold, silver, and other luxury items, including foreign exotica. This myopic focus on burials may be due to Herodotus' lengthy and detailed description of a royal Scythian funeral. Yet, Herodotus also indicates vibrant, albeit brief, socio-political and economic activities in the forest-steppe regions exemplified by his (short) discussion of Gelonus. Along these lines, this paper explore and assesses the development of trade systems and their possible routes that ran from the forest-steppe to the Black Sea coastline of present-day Ukraine. Of specific interest, is the emergence around 650 BC of large fortified settlements in the forest-steppe that seem to have acted as *entrepôt*, or alternatively what some archaeologists call 'gateway communities'. The emergence of the massive settlement and mortuary complex at Bel'sk (Gelonus?) and the large fortified settlement of Trakhtemirov (and a few others) in the forest-steppe is the central focus of this chapter, accompanied by the following questions: What led to the growth of expansive trade networks in the Pontic region? How did forest-steppe communities respond to the socio-economic opportunities presented by the arrival of Greek colonies along the Black Sea littoral around 650 BC? What led to the construction of these vast fortifications and what did they mean for community cohesion and the growth of large, possibly urban, population centres along the forest-steppe boundary?

Keywords: Scythians; forest-steppe; Greeks; gateway communities; trade; GIS

> 'Beyond the Alazonians there live Scythians who farm the land, though not with the aim of eating the crops they cultivate, but rather of selling them on. North of them live the Neurians; but beyond them, so far as we have knowledge, there is nothing but emptiness, where only the north wind has breath ...
>
> 'The tribe of the Boudinians is a great and a populous one, and all those who belong in it have piercing blue eyes and a ruddy complexion. There is a city in their country made of wood – the name of this city being Gelonus. Each side of its outer wall, which is 30 stades in length, and very high, is fashioned completely out of wood, as are the dwellings and shrines too. There are shrines there sacred to the Greek gods, and furnished in the Greek manner, complete with cult-statues, altars and wooden temples; and every third year a festival is held there in honour of Dionysus, at which Bacchic revels are staged. Originally, you see, the Gelonians were Greeks, who emigrated from their trading-posts, and settled among the Boudinians. The language they use is a mixture of Scythian and Greek'.[1]

Introduction

In Book 4 of his *Histories*, Herodotus offers some insights into the nature of the forest-steppe populations of the Pontic region, consisting primarily of present-day Ukraine and the southwest portion of the Russian Federation. What *is* said (cited above) is informative for scholars investigating the role that the forest-steppe played in the emergence of inter-regional socio-economic interactions, or trade systems, between the Greek colonies of the Black Sea littoral (or coastline), the 'Scythian' pastoralists of the Pontic steppe, and the agro-pastoral tribes of the Pontic forest-steppe (Figure 1). Herodotus establishes that there were tribes dedicated to the growing of wheat (and probably other agricultural products) for export, that these tribes had cities and towns, and that some of these cities were ethnically diverse and became mixed over time.[3] While Herodotus' *Histories* should be used cautiously, if not sparingly, it does provide a useful starting point in discussing the interaction(s) between the cultural and environmental zones of the Pontic region, *c.* 700–200 BC.

Interestingly, Konstantin Marchenko and Yuri Vinogradov noted that the study of the Iron Age Pontic region was, or at least until the late 1980s, usually

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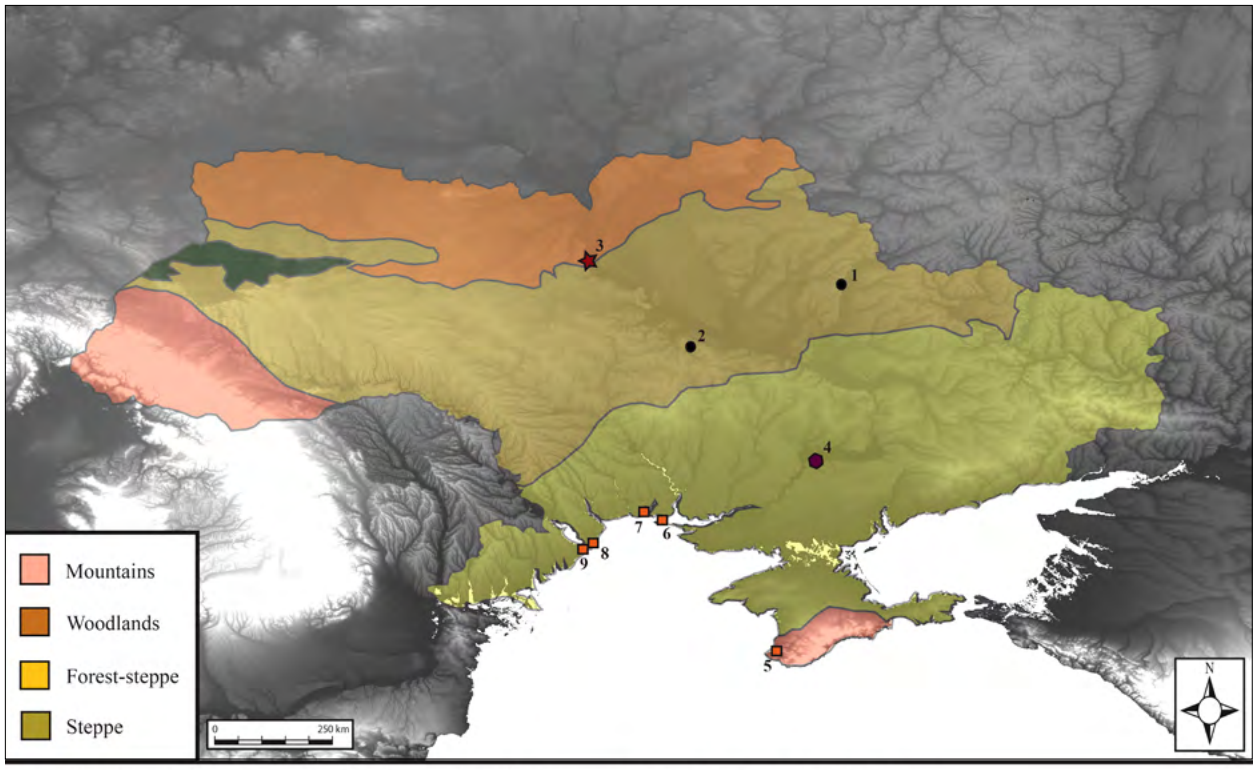
[2] Herodotus, *The Histories* 4.17, 108.

[3] Herodotus, *The Histories* 4.17–33.



1 - Bel'sk; 2 - Motroninskoye; 3 - present-day Kyiv; 4 - Kamenskoye; 5 - Chersonesos; 6 - Olbia; 7 - Berezan; 8 - Nikonian; 9 - Tyras

Figure 1. Map of the socio-environmental zones of Iron Age Ukraine and surrounding territories (after Ventresca Miller *et al.* forthcoming; adapted by the author)

separated into two separate fields: on one hand, the Greek city states, or *poleis*, and their colonies, and on the other, the barbarian periphery north of the Greek colonies usually focused on either the steppe or a steppe-dominated forest-steppe.[4] Marchenko and Vinogradov summarised the various efforts to conjoin these studies as 'occasional attempts ... made to view developments in terms of interdependence or interconnexion' with a focus on establishing the existence of these interconnections rather than more thoroughly exploring their historical and spatial manifestation.[5] Since Marchenko and Vinogradov's seminal publication on the northern Black Sea during the Iron Age, or Scythian period, numerous scholars have sought to document that the Greek Black Sea colonies, steppe Scythians, and forest-steppe tribes were linked.[6] At this point, there is little doubt as to the socio-economic nature, i.e. trade and exchange, of interactions between the populations of these 'zones'.

Yet, the issues related to the establishment and maintenance of mobility and trade systems between the forest-steppe and the Greek colonies of the Black Sea, as well as the Scythian steppe pastoralists, are an ongoing and unresolved topic of interest for numerous scholars.[7] This paper, which tackles this topic using published isotopic studies and geographic information systems, or GIS, grew out of one given at the Scythian conference hosted by the British Museum in October 2017. The conference was dedicated to exploring the rich and diverse lifestyles of the geographically and chronologically varied Scythian pastoral groups that occupied much of the Eurasian steppe from the Altai to central-western Ukraine (and beyond) between *c.* 900 and 200 BC. In this paper, I explore the establishment and growth of trade and exchange systems focused on the connections between Greek colonies along the Black Sea coastline and the urban populations in the forest-steppe living in large fortified settlements. To do this, I utilise two scales of interaction. The first is the broader scale, which takes a wider Mediterranean perspective to explore the socio-economic and political context for Greek colonisation and what this would have meant for the Pontic region in general, culminating between 550–300 BC. The second is the micro-regional scale, centred on the forest-steppe urban centres and their possible hinterlands focusing specifically on the settlement complex of Bel'sk. I assess how (and why) inter-regional and regional trade systems between Black Sea Greek colonies and forest-steppe agro-pastoralists emerged diachronically,

[4] Marchenko and Vinogradov 1989: 805.
[5] Marchenko and Vinogradov 1989: 805.
[6] Boltrik and Fialko 2007; Hannestad 2007; Ilinskaya and Terenozhkin 1983; Kovpanenko, Bessonova and Skory 1989; Rolle 2011; Vakhtina 2000.
[7] Braund and Kryzhitskiy eds 2007; Gabrielson and Lund eds 2007; Gavrilyuk 2003; 2007; Vakhtina 2007; Ventresca Miller *et al.* 2019.

leading to somewhat drastic, albeit short-lived, social change for communities in the forest-steppe in the form of urbanism, labour pooling, and social cohesion/integration. Before I do this, I briefly review the broader socio-economic and environmental activities in the Mediterranean that contributed to the founding of the Greek colonies along the northern Black Sea littoral.

Inter-regional interactions and colonisation, *c.* 700–200 BC

It should be noted that while the largest of the Iron Age fortified settlements, or what are often referred to as hillforts/*fürstensitze*/*oppida*/city-sites, are found in the Pontic forest-steppe, there are numerous and varied examples from Iron Age Europe and the broader Eurasian steppe/forest-steppe boundary.[8] Manuel Fernández-Götz *et al.* suggest that the earliest urban and proto-urban centres in temperate Europe emerged between the end of the 7th and 5th centuries BC, and that these sites can be found from Bourges in France to Baden-Württemberg in Germany to Závist in Bohemia.[9] However, the earliest examples of these 'towns' or 'cities' that we know of are found in the Pontic forest-steppe, dating to the first quarter/first half of the 7th century BC.[10] The common factor for Iron Age urban centres is their contact with Mediterranean (usually Greek and later Roman) societies and the growth and regularisation of trade and exchange systems that resulted.[11]

The colonisation of the Mediterranean and Black Sea coastlines by settlers from various Greek *poleis*, or city-states, happened in various stages and was part of a long, historical process of exploration. John Boardman suggests that the Mediterranean, and by extension the Black Sea, was ideal for such explorations and later efforts at colonisation given that there are no tides to speak of, easy currents to navigate, no need to travel the open sea, and relatively mild bouts of inclement weather.[12] By the Middle Bronze Age (or Middle Helladic Period), the Greeks had already developed an interest in Cyprus and parts of the Levant, along with various parts of the western Anatolian shoreline, i.e., the Ionian migrations. This period witnessed the emergence of the Mycenean state and subsequent, and possibly intensive, exploration of the Mediterranean. Perhaps most importantly, is that the Middle and Late Helladic (*c.* 2000 – 1550/1550–1050 BC) periods saw the Greeks familiarize themselves with the more far-flung parts of the Mediterranean basin and the routes into the Black Sea/Pontic region.

What is of specific interest for this chapter, and the readers of this volume, is the possible reasons for Greek colonisation, which were collectively an impetus for the growth of urban centres in the European and Pontic Iron Ages. Speculation regarding the reasons for colonisation in the Black Sea region provides us with the background needed to further conceptualize the socio-economic connections between the Greek colonies and forest-steppe urban centres during the middle to late Scythian period, *c.* 550–200 BC, of the Pontic Iron Age. What motivated the Greeks to colonise the Mediterranean and later move into the Black Sea region is still a driving question for many researchers. Certainly, by the beginning of the Archaic period, *c.* 800–480 BC, the Greeks began to form (or possibly re-form) their *poleis*. Boardman suggests that by the 6th century BC, colonisation to the west had become more about expansion and consolidation,[13] whereas the efforts to the east and north, especially those focused on the Black Sea, were centred on exploitation of additional resources, acquisition of land, and relieving overpopulation in ancient Greece.[14]

These factors – resource exploitation, land acquisition, and overpopulation – indicate that Greek colonisation and subsequent trade between with what Barry Cunliffe refers to as the 'barbarian periphery' was incredibly complex and multivalent.[15] Numerous scholars focus on a single type of trade good in the northern Black Sea region. For example, there are suggestions that there is little, if any, evidence for grain as an inter-regional trade good in the northern Black Sea.[16] This suggestion is based largely on the idea that pastoral economies have little need for grain and thus no need to trade for it. Yet, the issue is not what was being traded between the Greeks and steppe pastoralists; rather the issue is what was exchanged between forest-steppe populations, who did not have strict pastoral economies, and the Black Sea colonies. Forest-steppe economies were more broadly agricultural, including harvesting grains *and* animal husbandry, as well as pastoral herding. Cereal production at the forest-steppe settlements is well-attested through various kinds of evidence. At Trakhtemirov, a large fortified settlement of approximately 630 hectares and located on the west bank of the Dnieper river, agricultural implements such as scythes and sickles were recovered. In addition, special pits used for grain storage were identified during excavations.[17] Based on impressions of grains found on the exterior and interior of handmade pottery from Trakhtemirov,

[8] Fernández-Götz *et al.* 2014; Koryakova and Epimakhov 2007.
[9] Fernández-Götz *et al.* 2014: 3.
[10] Gavrilyuk 1999; Melyukova 1995; Shramko 1987.
[11] Collis 2014.
[12] Boardman 2001: 322.
[13] Boardman 2001: 40.
[14] Boltrik and Fialko 2007; Gavrilyuk 1999; 2003; Kovpanenko, Bessonova and Skory 1989; Leypunskaya 2007; Shcheglov 1990; Taylor 1994; 2001.
[15] Cunliffe 1988; see also Bonfante ed. 2011.
[16] Gavrilyuk 1999; 2003; Leypunskaya 2007; Shcheglov 1990.
[17] Boltrik and Fialko 2007: 109.

a variety of cereals were present in the Pontic Iron Age, including: wheat (*Triticum compactum*), barley (*Hordeum vulgare*), millet (*Panicum miliaceum*), as well as peas (*Pisum sativum*) and hemp (*Cannabis sativa*).[18] Given that pits like those found at Trakhtemirov were also discovered at other forest-steppe large settlements such as Motroninskaya, we can imagine that cereals and other plants were stored at the large settlements. In addition, actual seeds from cereals were found at the large settlement complex of Bel'sk.[19] Based on the growing body of evidence, inter-regional trade of various grains should not be dismissed out of hand. Indeed, David Braund suggests that 'the issue is not whether the grain came from the (Black Sea) region to Athens *at all*. It is, rather, whether such grain as did come in via trade was brought in significant quantities and on a more-or-less regular basis'.[20]

Furthermore, recent isotopic studies of diet among Late Bronze Age Greeks, as well as Archaic–Classical Greek colonists and Pontic Iron Age forest-steppe populations, provides intriguing, if not compelling, insights into the type of food stuffs grown, consumed, and traded in the Pontic region. Eirini Petroutsa and Sotiris Manolis suggest that Late Bronze Age Greek 'homeland' populations, including those living in Mycenean palatial centres, consumed mostly C_3 plants such as wheat, as well as animal proteins with a specific focus on sheep, goat, and cattle.[21] In addition, they note that Mycenean diets were supplemented occasionally by marine resources and C_4 plants such as millet. They further suggest that diet was determined largely by social status, with those individuals exhibiting higher social status having diets rich in C_3 plants, whereas those of lower status had diets with a strong signature for C_4 plants.[22]

Clearly, while millet and other C_4 plants were available, wheat was the preferred grain even as far back as the Late Bronze Age. This preference continues into the Archaic through Hellenistic periods, as noted by Efrossini Vika.[23] Vika explores changes in diet over time as evinced through stable isotopic analyses of human and faunal remains recovered from the cemetery at Archaic and Classical period Thebes. She notes that the population of Thebes relied heavily on C_3 plants, but there is some evidence of consumption of C_4 plants.[24] Consumption of marine resources appears not to have been significant and animal proteins, while identifiable, were also not predominant parts of the diet. Interestingly, the results from both studies conform to an earlier analysis of sample populations from Apollonia, a Classical period Greek colony along the Bulgarian coastline of the Black Sea.

Anne Keenleyside *et al.* note that the ancient Greeks (at least on the Bulgarian coastline) relied on the 'Mediterranean triad' of cereals, olive oil and wine for their subsistence, with wheat and barley forming the bulk of the cereals consumed and that C_4 plants were used only in emergency cases.[25] They also note, drawing upon previous studies, that sheep and goat were the primary sources for animal proteins. Of more interest is that there was another noticeable separation of diet by social status, with the wealthy consuming goods made from wheat, whereas the poor, slaves, and animals ate barley, and we can assume other cereals such as millet. Keenleyside *et al.* note that Apollonia colonists relied primarily on C_3 plants and animals for their subsistence, with little evidence for C_4 plant consumption.[26] The authors found little correlation between social status (by grave type or number of grave goods) and diet, mostly due to the few grave goods deposited in burials.

What these studies do provide is an insightful backdrop for research into diet, trade, status, and mobility during the Iron Age of the Pontic region. Whereas diets based on wheat and barley (and/or millet) are often seen as signaling differences in social status in the Classical Greek world, the aforementioned authors suggest that homeland Greeks and colonists both consumed cereals such as wheat along status-driven lines. Recently, the Bel'sk–Gelonus Project, funded by the National Geographic Society, conducted strontium, oxygen, and carbon isotopic analyses on osteological samples obtained from twenty individuals interred in several of the Bel'sk cemeteries to evaluate mobility (local/non-local) and diet. Our results suggest that of the individuals sampled, the majority had diets comprised primarily of C_4 plants, most likely millet and that many of these individuals were local.[27] The Bel'sk study conforms broadly to the results of the previous studies: diets consisting of C_3 and C_4 plants were split, along both status (although unconfirmed at this point due to lack of information of grave good assemblages) and local/non-local, respectively, indicating that Bel'sk populations were primarily local and probably non-Greek, if Greek preferences for C_3 plants hold true.

The growth in demand for various cereals was beyond the capability of Greeks to meet themselves as deforestation and erosion were becoming increasingly widespread in Greece as there were similar demands for other products. Since at least the early 1980s, there

[18] Boltrik and Fialko 2007: 109–11.
[19] Shramko and Yanushevich 1985.
[20] Braund 2007: 39.
[21] Petroutsa and Manolis 2010.
[22] Petroutsa and Manolis 2010: 619–20.
[23] Vika 2011.
[24] Vika 2011: 1157.
[25] Keenleyside, Schwarcz and Panayotova 2006: 1207.
[26] Keenleyside, Schwarcz and Panayotova 2006: 1212.
[27] Ventresca Miller *et al.* 2019.

has been a growing, but still small, body of scholarship that suggests that by the Archaic and certainly into the Classical and Hellenistic periods, Greece was experiencing varying degrees of environmental stress from deforestation and soil erosion.[28] These studies note the impact of different industrial activities on the environment of ancient Greece, including: 1) timber exploitation for ship-building, architecture, and as fuel for the kilns and furnaces required by various industries, including pottery and metal production; 2) grazing by sheep, goats, and cattle; and 3) mining. Even as deforestation progressed with increasing urbanisation and new military ventures, ceramic and metal production required massive amounts of fuel, as well as ship-building and architecture, in the various poleis of the Archaic and Classical periods.[29] Thomas Wertime states that compounding the impact of timber exploitation and resultant deforestation was the effect of grazing by herd animals, especially goats.[30] Tree saplings were not given the chance to replenish forests too heavily utilised and thus contributed greatly to continued deforestation and soil erosion as saplings are especially susceptible to the grazing of goats. The above authors suggest that the effects of deforestation and soil erosion during antiquity can still be seen today as the environment has been slow to recover from such long-term, intensive exploitation.

We can confidently infer that timber was harvested at increasing rates during the Mycenean periods, or Late Bronze Age, and then again in the Archaic through Classical periods concomitant with drastic increases in urbanisation. The increase in urbanisation in the Late Bronze Age, and the emergence of the poleis in the Archaic and Classical periods, led to a greater demand in subsistence production focusing on cereal production and animal husbandry focusing on cattle, sheep, and goats. Given that demographic growth and centralisation are vital components in urbanisation, building programmes such as those documented for the Classical period necessitated a massive labour force, made up of slaves, freemen, and artisans.[31] Thus, given the deteriorating environmental conditions in the Greek homeland concurrent with dramatic upticks in population size and demand for subsistence goods, we can speculate that the goods traded between the homeland and the colonies consisted of a spectrum of items, some of which were seasonal and others that were traded year-round. Questions we are left with include, but are not limited to, how were goods moved between the Pontic regions and what did these inter-regional trade systems mean for the Pontic forest-steppe populations?

[28] Hughes 2011; Hughes and Thirgood 1982; Runnels 1995; Van Andel, Zanagger and Demitrack 1990; Wertime 1983.
[29] Hughes and Thirgood 1982.
[30] Wertime 1983.
[31] Finley 1962; Burford 1963; Osborne 1999.

Emergence of trade networks and gateway communities in the Pontic Iron Age

What was traded and transported from the forest-steppe to the Greek colonies and possibly from there the Greek homeland is still an enigma, and thus any suggestion is (again) rather speculative. What is known more definitively is what was provided in return for these trade goods. Across temperate Europe and the Pontic forest-steppe and steppe, there was a growing demand for wine and Attic Greek drinking and serving equipment, including silver, gold, and black figured vessels, such as the rhyton and kylix. Nadezhda Gavrilyuk suggests that the wine trade with the inhabitants of the Pontic region, including the steppe and forest-steppe groups, was especially prolific and, as a result, highly profitable.[32] Gavrilyuk also notes that 'pride of place' in terms of quantity among the various categories of Greek imports in the Pontic Scythian archaeological contexts is taken by the amphorae used to store wine or olive oil for transportation.[33] Wine, and the vessels used to transport it, were widespread items for use by steppe and forest-steppe elites. Wine consumption signaled not only a reliance on foreign exotica and the 'ritual destruction' through symbolic and physical deposition of the containers, strongly indicates regular trade between the cultural regions of the Pontus.

The advent of these trade systems in the 7th century BC contributed importantly to the socio-economic and political developments in the Pontic forest-steppe, not least of which was the emergence of large settlements that were eventually fortified. These large settlements, however, were not alone and were parts of longer-term demographic centralisation processes that went hand-in-hand with the urbanisation of the forest-steppe in the 7th and 6th centuries BC, culminating in the 4th century BC. One of the patterns of centralisation that emerges is that groups or clusters of settlements, perhaps hierarchical, appear along the major river valleys, their tributaries, and associated seasonal drainages. Both Vladimira Petrenko and Renate Rolle plotted these clusters in the forest-steppe, with many of the largest 'city-sites' represented (Figure 2).[34] An important caveat for these settlement groups is that their exact chronological frameworks have yet to be established in terms of contemporaneity of the settlements, most of which appear between the 7th and 4th centuries BC.

For instance, Yuri Boltrik and Elena Fialko suggest that Trakhtemirov can be dated reliably from the second half of the 7th century BC to the end of the 6th century BC, or roughly 150 years, when the settlement

[32] Gavrilyuk 2003; 2007.
[33] Gavrilyuk 2003: 238.
[34] Petrenko 1989: 67; Rolle 2011: 114.

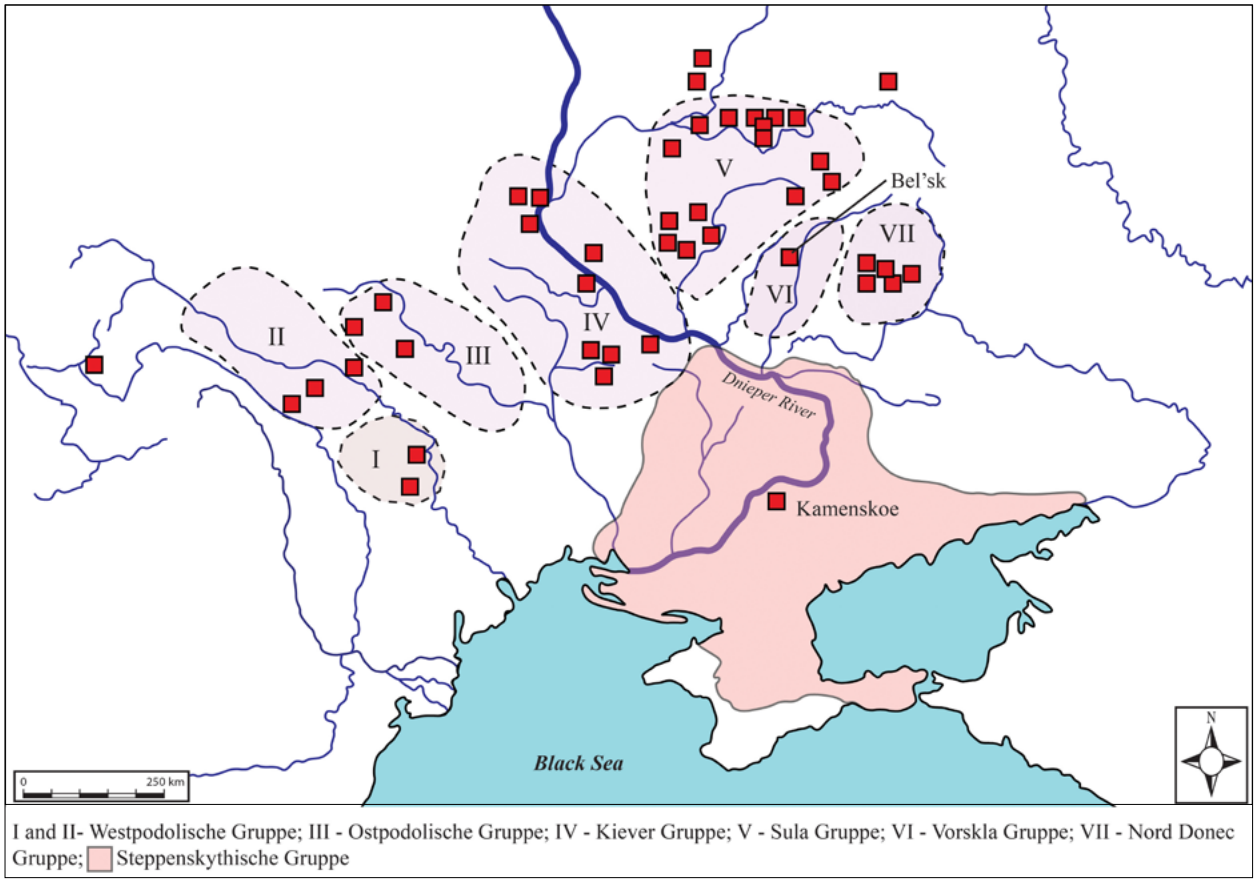


Figure 2. Distribution map of forest-steppe 'cultural' or ethnic settlements (after Rolle 2011: 114; Petrenko 1989: 67; adapted by the author)

appears to have been completely abandoned.[35] They also note that sometime around 575 BC, there was a sustained attack, most likely from steppe Scythians, with evidence provided by the recovery of dozens of arrowheads, pieces of armour, and various weapons. However, what led to the abandonment some 75 years later is unknown. Other sites in that spatial cluster include Motroninskaya (200 ha) and Pastyrskoye (18 ha).[36] Svetlana Bessonova and Sergej Skory date the occupation at Motroninskaya from the 7th century BC to the first quarter of the 5th century BC, i.e. 125 years.[37] The occupation of Pastyrskoye is dated to between the 6th century BC to the 3rd century BC, or some three centuries.[38] The longer-term occupation of a much smaller, hinterland site is not unsurprising as hinterland sites are generally more self-sufficient, although not always autonomous, as they do not necessarily depend on inter-regional trade for their existence.

Despite the disjointed occupational chronologies, we can ascertain that there was an impetus for demographic centralisation, and in some cases urbanisation, in the 7th century BC, most likely resulting from early contacts with the Greek colonies. A few settlements, such as Trakhtemirov and the Bel'sk complex, exhibit earlier occupation phases and sometimes much longer occupation spans. While the forest-steppe settlements are currently being assessed in terms of location, size, and occupation chronology,[39] there is no doubt as to the early connections between the Greek colonies and the large forest-steppe 'city-sites', which reached their largest sizes in or around the 5th century BC. Marina Vakhtina provides conclusive evidence of the timing of contacts between the Greek colonies and the forest-steppe settlements.[40] She notes that at settlements across the forest-steppe, including Nemirov, Trakhtemirov, and Bel'sk (as well as others), Greek ceramics of one sort or another were found at each settlement that can be dated reliably to the second half of the 7th century BC, confirmed for Bel'sk by S. Zadnikov.[41]

Interestingly, there is a clear trend of growth of trade systems indicated by the number of Greek ceramics found in the Pontic Iron Age. Small quantities of ceramics are initially found in these settlements and

[35] Boltrik and Fialko 2007: 116–17.
[36] Boltrik and Fialko 2007: 105.
[37] Bessonova and Skory 2001: 5.
[38] Kovpanenko, Bessonova and Skory 1989: 173.
[39] Johnson *et al.* forthcoming.
[40] Vakhtina 2007.
[41] Zadnikov 2009.

indicate early contact between the Greek colonies, especially Berezan, and the forest-steppe populations.[42] Sergey Solovyov notes trade between these groups is often dismissed due to the relative paucity of ceramics, especially when compared to the vast quantity of ceramics discovered nearly a century later, in particular between the 6th and 5th centuries BC.[43] Yet, Solovyov's critics fail to account for the historical conditioning of trade and exchange systems; they do not emerge fully formed and operational. Rather, culture contact and the establishment of regularly-used trade systems (and their routes or pathways) takes time, and the routes to and between each group's location must be scouted, memorized, mapped, and traversed numerous times for this to happen.

The emergence and establishment of regularized inter-regional trade between forest-steppe communities and newly established colonies such as Berezan, an island town just outside the mouth of the Dnieper river, indicates intriguing possibilities for the different scales of socio-economic activities in the Pontic region during this time. Excavations at Berezan in the 1980s and 1990s yielded strong evidence in the form of forest-steppe pottery that indicates not only was trade happening between forest-steppe communities and Greek colonies, but that

- inhabitants of the Pontic forest-steppe were most likely moving around a great deal;
- knowledge of newcomers must have spread as well;
- and that the intrusion of Scythian tribes, at least initially, may not have been thought of as a pervasive threat to either the forest-steppe groups or the Greek colonies.

The arrival of Greek settlers around 650 BC contributed to the rapid growth of large, fortified settlements in the Pontic forest-steppe. Very few, if any, scholars deny the fact that these large settlements or settlement complexes were urban in nature. Questions that remain, however, centre on the type of urbanism that emerged in the Pontic region and what these urban centres meant for local or even supra-local communities. Given the large open spaces, storage pits/areas, and possibilities for intensive production seen at sites such as Bel'sk, a likely scenario involves the larger settlements serving as *entrepôt* (staging points for trade and distribution of various material goods). Similarly, Barry Cunliffe suggests that European Iron Age hillforts acted as 'gateway communities' for regional and inter-regional trade and exchange between themselves and Mediterranean societies with the hillforts storing and funneling copious quantities of goods.[44] Kenneth Hirth's original conceptualization of 'gateway community' indicates that:

- gateway communities develop as increased trade and/or the settling of sparsely populated frontier areas;
- usually located along natural corridors of communication. These corridors act as critical passages between areas of high resource productivity;
- the communities appear at the interface of different technologies and/or levels of socio-political complexity;
- these communities appear along economic 'shear lines' where cost factors change and where there are economic discontinuities in the free movement of goods;
- the communities satisfy the demand for commodities through trade;
- the location of these communities reduces transportation costs involved in the movement of goods.[45]

The gateway community is a logical model for the Pontic Iron Age, if not for one factor: gateway communities result from core-periphery relations, as derived from Immanuel Wallerstein's world-systems theory. Cunliffe states that inter-regional economic dynamics in the European Iron Age between the Mediterranean core and the 'barbarian', i.e., non-Mediterranean periphery, reached its apex after the 2nd century BC with the Romans and the efforts to build and expand its empire.[46] He also suggests that the preceding centuries leading up to the Roman empire were relatively slow in terms of economic exchange between the Mediterranean 'core' and the 'barbarian' periphery.

This scenario seems a good fit, except for the fact that the earliest hillforts or cities/towns first appeared between *c.* 650–550 BC, with a subsequent urban development that led to the later emergence of major oppida such as Manching in west-central and central Europe.[47] That said, there are questions whether derivative models of core-periphery relations can fully explain the socio-economic dynamics between Mediterranean societies such as the Greeks or the Romans and their 'barbarian' north while accounting for the independent, agentive actions of peripheral populations.[48] While long-distance trade systems benefit most, if not all, those involved, this does not mean that other forces or plans were not at play. For this paper, as well as broader considerations of the emergence of these fortified settlements, it may

[42] Kovpanenko, Bessonova and Skory 1989; Solovyov 1999; Vakhtina 2007.
[43] Solovyov 1999: 4–5.
[44] Cunliffe 1988.
[45] Hirth 1978: 7.
[46] Cunliffe 1988: 6–7.
[47] Collis 2014: 18–21; Fernández-Götz *et al.* 2014.
[48] Stein 2002.

be best to assume a more cautious approach and call the largest of these settlements *entrepôt*, thus avoiding the baggage of core-periphery relations which have little evidence for either economic domination or coercive force that would signal core-periphery relations. Rather, the developments of the forest-steppe and heavily wooded areas of temperate Europe should be envisioned as largely autonomous developments that were part of multivariate trade systems which played out at the local to the supra-local to the inter-regional scales.[49] In this sense, we might understand what's going on in the Iron Age Pontic region as an expression of competing trade clusters with associated hierarchies of urban and rural staging points with sites such as Bel'sk and Trakhtemirov acting as the primary centres for their respective micro-regions. To explore this a bit further, I focus first on modelling the trade systems and their possible routes involving the forest-steppe and the Greek colonies along the Black Sea littoral, and second, evaluating the impact that inter-regional trade had on the emergence of the Bel'sk settlement complex and the construction of its massive fortifications.

GIS modelling of the Pontic Iron Age trade circulatory system

While *entrepôt*, rather than 'gateway community', is a more fitting term for the larger, urban settlements of the Pontic forest-steppe, there are some general characteristics of the gateway community which are informative as to the historical and spatial conditioning of any type of trade-centred cities or towns.[50] These characteristics include:

- they develop as the result of trade and demographic centralisation;
- they are located along natural corridors of communication;
- they satisfy the demand for commodities through trade;
- their location reduces transportation costs for the goods involved. Clearly, the larger forest-steppe settlements were the result of socio-economic centripetal forces that lead to the types of intensive demographic centralisation usually seen in ancient, as well as modern, cities. The overall size of these settlements indicates that there were substantial populations in these settlements; a topic to which I will return shortly.

As to the second and fourth points centred on location (with the third point discussed later), Marina Daragan demonstrates that these settlements did not just follow the steppe/forest-steppe boundary but are also found along the courses of major rivers and their tributaries and are spread across the forest-steppe (Figure 3).[51] Some of the largest settlements follow the major bend in the Dnieper river. Others, such as Bel'sk, are located along major tributaries such as the Vorskla river on the east side of the Dnieper. More germane to this chapter is that these settlement locations can be envisioned (per the third point) as gathering points, in a complex, inter-regional trade system that acted as centres for communication and helped reduce transportation costs. Using the Dnieper as the central route in this trade system also allowed for later developments such as the appearance of the Kamenskaya settlement along a major chokepoint for the Dnieper river and its both socio-economic and hydrological flow into the Black Sea.[52] For settlements located on the west side of the Dnieper a combination of land and riverine trade routes would make sense given their distance from the Dnieper (Figure 3).

The location of these settlements serves as a crucial first step in assessing the possibility for the establishment of an inter- and intra-regional trade systems. Based on data gleaned from Shramko's suggestion of other settlements around the Bel'sk complex in east-central Ukraine,[53] as well as Petrenko's and Daragan's maps of settlements in the Kiev-Cherkassy region,[54] we gain a better understanding of how such a trade system might have worked. That said, I need to point out that many of these locations were not recorded with a high degree of precision, i.e., using global positioning systems equipment, or GPS. Rather, I have transposed these settlements onto a digital elevation model, or DEM, obtained from the USGS Earth Explorer website, with settlement location determined by assessing similarities and proximities to geographic features such as major rivers and tributaries as displayed on Shramko's, Petrenko's, and Daragan's maps. The important point here is that we gain a better idea of what was likely happening spatially so that we can then develop a heuristic understanding of the possible inter-regional movements of people and goods between the Black Sea littoral, Pontic steppe, and the forest-steppe.

Figure 3 offers a preliminary view of the socio-physical factors such as elevation and distance, which were involved in movements between and/or through the regions in the Pontic area. Using ESRI-based ArcGIS (version 10.3.1), I modeled the costs involved in these movements based only on slope. In other words, moving up and down hill or across flat areas are treated as different costs with more laborious effort, i.e., it costs more to traverse uphill on a steep slope than to travel across a flat area of steppe. Due to time constraints, I

[49] Shramko 1987.
[50] See Hirth 1978.
[51] Daragan 2017*b*.
[52] Grakov 1954.
[53] Shramko 1987: 114.
[54] Petrenko 1989; Daragan 2017*b*.

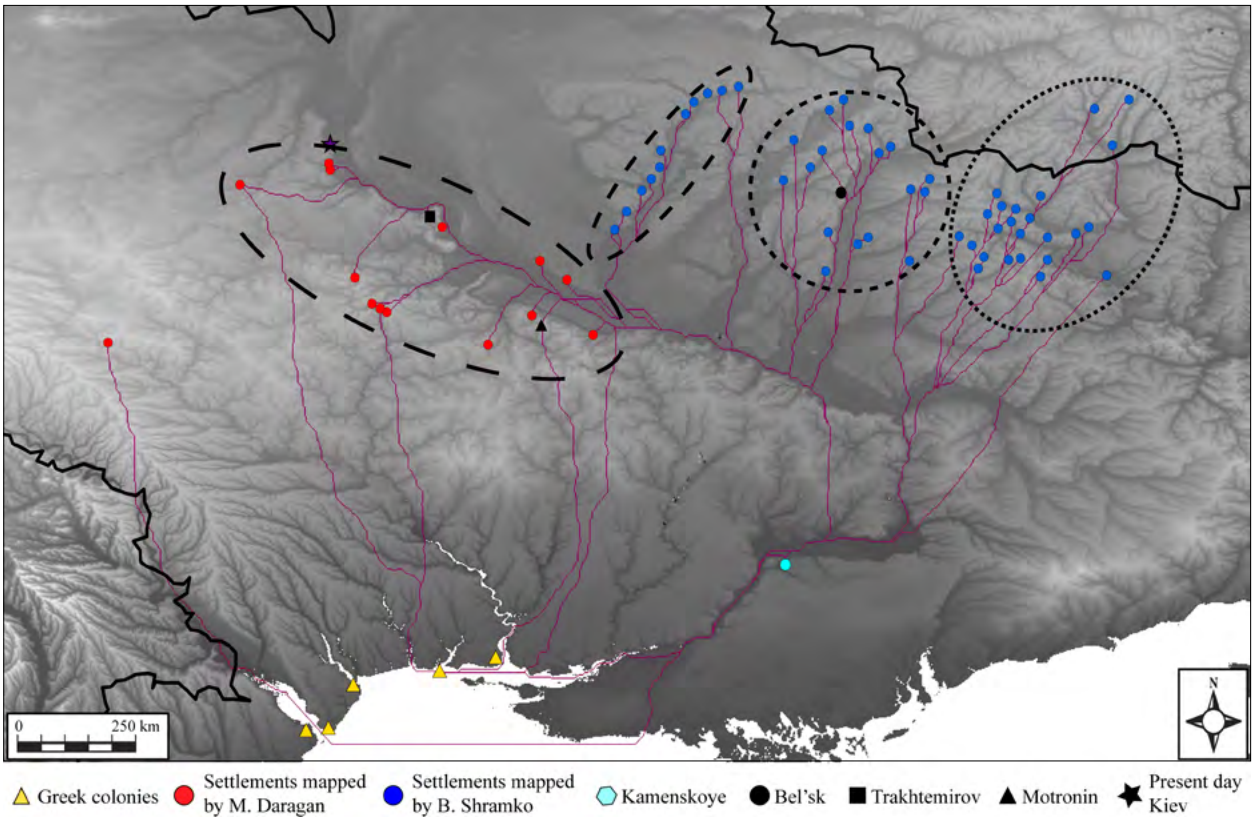


Figure 3. DEM of the Pontic region with assembled settlement data shown (after Daragan 2017; Shramko 1987; 2016). Least cost path analyses shown in purple and possible trading or socio-economic groups identified by different dashed ellipses (analysis and image by the author)

have not expanded (yet) the assessment of costs based on obstacles such as forested vs. non-forested areas or different modes of transportation used, including use of horses, wagons, etc. This 'weighted cost', or obstacle-based, assessment will prove a valuable future expansion to this work as it provides nuance to the reconstructed inter- and intra-regional trade systems. That said, there are some clear possibilities here for not only considering movement, but also further consideration of the geographic and socio-cultural location of these settlements. As can be seen in Figure 3, there is a mix of possible routes taken (by river and over land) but with an overall trend for regional movement along rivers and their major tributaries and drainages. However, there is also movement overland given the location of settlements such as Nemirov located on the west side of the Dnieper without easy access to the Dnieper. This should not come as a surprise given the widespread use of the horse and wagons by the various inhabitants of the Pontic region. Indeed, the horse and cart had an ameliorative effect on the labour of traversing some of the areas in the forest-steppe and steppe. Several settlements were examined in terms of travel over land and/or sea to see which was more likely and cost effective. These settlements and their by-land cost paths can be identified by the direct southerly route taken over land to end at the nearest Greek colony. Finally, there is also travel over sea to get to the major Greek trading posts, although it is likely this changed over time and that these trade routes would have stopped at the nearest Greek colony.

At the same time, it is worthwhile to note two faulty assumptions involved with least cost path analyses. The first assumption is that people traverse routes and paths to minimize their physical effort or social inconvenience. While this certainly *can* be the case, it is *not always* so. Social, economic, and political factors often play a role in deciding what route to travel in terms of avoiding socio-political territory and borders, traveling through areas that might be better utilised or exploited on the way through, and/or the possibility for arranging for alliances. Second, that 'pathways' are of equal value through time. Pathways and routes are historically conditioned. This means that they have a life history, with greater costs in the beginning of their use and fewer or lesser costs after they are established. This might mean the actual paths become standardised with modification of the natural landscape to ease passage. Also, socio-political developments might affect the physical traversing of the route(s). These factors, if documented, might be mapped into a weighted cost analysis. The point is that the least cost path presented here is not a definite representation of travel/transportation routes in the Pontic region. Rather, it offers a heuristic for conceptualizing what

may have brought the forest-steppe groups together – shared socio-economic interests and the emergence of some sort of urbanism in the Pontic forest-steppe.

Such a heuristic offers more support for the idea that the groups identified by Petrenko,[55] Rolle,[56] and Daragan[57] may not be cultural or even ethnic in nature but rather may indicate socio-economic/trade groups or alliances of assorted sizes of the forest-settlements, with the possibility for urban-rural or centre-hinterland dynamics.[58] Certainly, the least-cost path analyses offered here indicates that clusters of settlements may have used the same major routes or arteries for movement of goods, and by extension, treated urban centres like Bel'sk and Trakhtemirov as major staging points for these movements. Yet, the idea that these trade systems had an impact on urban-rural relations at each locality remains largely speculative. Using Bel'sk as my primary case study, I explore the possibility of urban-rural interaction, if not integration, by calculating demographic estimates for the Bel'sk complex based on the number of labourers needed to construct the massive fortifications of the city-site to assess whether rural labourers were needed during construction. Although equally speculative, demographic estimates, however crude, can act as a window into the scale and intensity of urban-rural relations.

Fortifications and settlements at the Bel'sk city-site

Bel'sk is a massive fortified settlement and mortuary complex located in the Poltava region in east central Ukraine. Strategically situated on the boundary of the steppe and forest-steppe, the Bel'sk fortifications, dated to the 7th–6th centuries BC,[59] span approximately 33 km and fully enclose a plateau partitioned by streams and loess channels, linking three separate fortified settlements into a single complex. The eastern and western settlements (Vostochnoe and Zapadnoe) found within the larger Bel'sk complex are separately enclosed and encompass approximately 65.2 and 72 hectares, respectively. The Kuzemin settlement, encompassing some 15 ha, represents a later, northeastern extension to the complex.[60] All told, the Bel'sk settlement complex covers an astounding 4000+ ha (Figure 4).

If we investigate Bel'sk as a historically conditioned complex of fortifications, settlements, and cemeteries that resulted from accumulative, periodic efforts by local populations, then this significantly alters how we think about the site. This includes interpretations of Bel'sk as a major urban centre dedicated to trade with and/or defense from either raiding groups of Scythians from the steppe or possibly other forest-steppe socio-economic groups, who may have competed over trade, territory, and control over trade routes. At 4000+ ha, Bel'sk easily dwarfs every other complex in Iron Age Eurasia. But it is important to note that, at least to the best of our current knowledge, the vast majority of this space was not permanently occupied though more recently a non-fortified 'village' and small cemetery was identified inside of the complex's fortifications, but external to the Zapadnoe settlement fortifications.[61] Given the ratio of occupied space to unoccupied space, with a generous, albeit approximate, estimate of 300 ha to 3700 ha or 1:12.3, respectively, there is a primary question to be asked: Were there enough people from the three settlements to construct the 33 km fortifications near the middle to the end of the 6th century BC?

Clearly, around this time something spurred the construction of the fortifications, which officially linked the three known settlements into a shared, possibly urban or proto-urban, community. The fact that Kamenskaya, the fortified Scythian settlement located at the point on the Dnieper that allows access to the Black Sea colonies is constructed around the same time indicates a widespread need for large staging points such as *entrepôt* that were well-fortified.[62] The unoccupied space of Bel'sk could have been used for any number of things, and most likely several uses at once, based on the types of goods collected and transported. Tim Taylor suggests that the unoccupied space of Bel'sk was used to pen large numbers of slaves.[63] Another possibility is that large herds of livestock were kept or penned as well. Yet, another possibility was that these open spaces were used to host mobile pastoralists during their visits to the forest-steppe. At least one other possibility is that the open space of Bel'sk was used to house hinterland or rural populations during times of conflict and strife. Until work such as geophysical and geochemical surveys, as well as systematic pedestrian survey and surface collection, are carried out we are unlikely to be able to do more than speculate about the use of this space. At the same time, the earthen embankments probably served a dual purpose – keeping something out while also keeping things in. There is some evidence that the wall was attacked at least a few times, most likely by Scythian raiders from the steppe.[64] The fortifications were clearly multi-functional in that the complex itself acted as a large central meeting or staging point, even as it acted as a staging or holding area for tradable

[55] Petrenko 1989.
[56] Rolle 2011.
[57] Daragan 2017*b*.
[58] Kovpanenko, Bessonova and Skory 1989; Daragan 2017*b*; Johnson *et al*. forthcoming.
[59] Rolle, Murzhin and Shramko 1996.
[60] Shramko 1987.
[61] Makhortykh 2013.
[62] Gavrilyuk 1999; Grakov 1954.
[63] Taylor 1994; 2010.
[64] Rolle, Murzhin and Shramko 1996; Makhortykh and Rolle 2011.

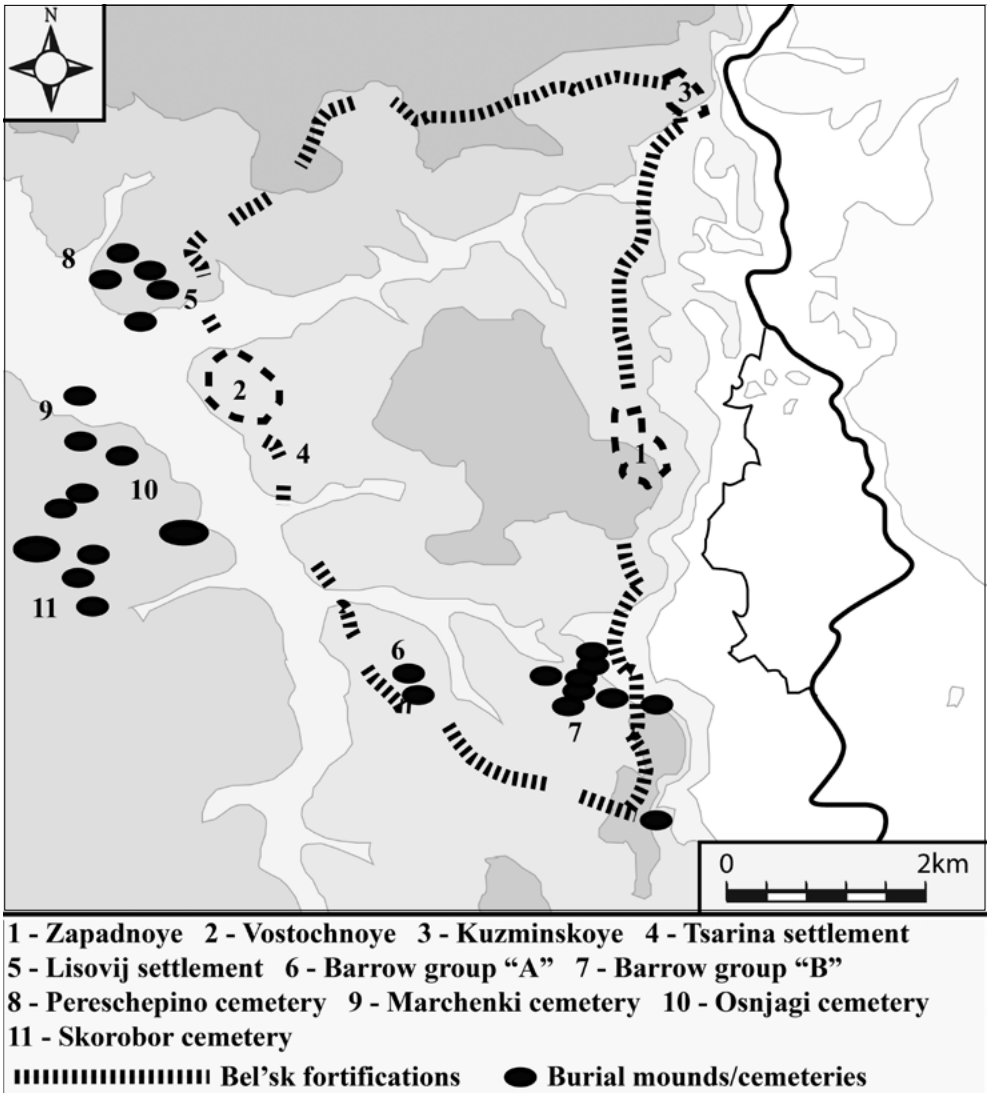

N
0
2km
1 - Zapadnoye 2 - Vostochnoye 3 - Kuzminskoye 4 - Tsarina settlement
5 - Lisovij settlement 6 - Barrow group "A" 7 - Barrow group "B"
8 - Pereschepino cemetery 9 - Marchenki cemetery 10 - Osnjagi cemetery
11 - Skorobor cemetery
Bel'sk fortifications
Burial mounds/cemeteries

Figure 4. Image of the Bel'sk locality (after Makhortykh 2013; adapted by the author)

goods or commodities and as a defensive bulwark against raiders.

Yet, the 33 km fortification wall was as socially, and perhaps politically, symbolic as it was economically functional. By socially symbolic I mean that the embankment represented collective labour towards its construction. North American archaeologist Wesley Bernardini uses energetic analysis to assess the social and physical parameters of construction to estimate labour costs and generate labour population estimates for the workforce needed to build the Hopewell period geometric earthworks in southern Ohio (USA).[65] Based on the formula used to estimate the volume for a trapezoid, or roughly the shape of the earthen embankment, we get V (volume) if A is the trapezoid top, B is the trapezoid bottom, H is the trapezoid height, and L is the trapezoid length, our formula then is V = LH(A+B)/2). The application of this formula in metres {(V = 33,000 x 6(6+27)/2)} results in (V = 198,000 x 16.5) for a rough estimate of 3,267,000 cu. m. of soil in the fortifications.[66] Given 7.33 of person hours needed to move each cu. m. of soil, as derived from ethnographic documentation,[67] the total work hours is 23,947,110, or 997,797 (24 hour) days, for one person to attempt such a Herculean task on their own. One might ask what this translates to in number of years: a single labourer would need to work for 2,734 years before the embankment was completed. In other words, if construction of the fortification began in 550 BC and that individual rushed the construction in the later periods of labour, there would still be some 200+ years of work to go before completion. Since we know that the fortification wall was completed, it is certain that a larger labour force was utilised. The size of this labour force would depend on how crucial (in terms of impending threats/conflict) it was to have that wall in place, which would affect the speed of construction. To come to our final estimates, we must think in terms of labour days rather than full

[65] Bernardini 2004.

[66] Cf. Rolle, Murzhin and Shramko 1996.

[67] Bernardini 2004.

days. If we start with eight-hour work days, seven days per week (997,797 x 3 or 24/8) we come to a total of 2,993,391 labour days. From here we can determine the number of labourers needed to accomplish the fortifications with a range of yearly estimates. For instance, for an approximate three-year completion estimate, the labour force must have been at least 2,500 labourers working 365 days/year. For a five-year estimate then, there must have been a workforce of nearly 1,600 labourers. Finally, for a ten-year estimate we come to an estimate of 820 labourers.

Interestingly, population estimates for the Bel'sk complex indicate that there either were labourers to spare or that there may not have been enough from within to complete the fortifications. Boris Shramko suggests that the overall population of the Bel'sk settlement complex was somewhere between 40,000 and 50,000.[68] However, Bessonova states that for Motroninskaya, a site of less than 200 ha, the population was approximately 5000.[69] Given that none of the Bel'sk settlements are even close to 200 ha in area, there might need to be serious rethinking of the population estimates for Bel'sk. At 62.5 and 72 ha, the two larger Bel'sk settlements probably had populations around 1500–1800 (at maximum), depending on use of the settlement space (living space versus working/storage space) with settlement space comprised of actual dwellings. Yet, Shramko details the presence of numerous workshops and their related industries focused on iron-working and pottery production.[70] If there are at least 50 dwellings at Vostochnoye and maybe a similar amount at Zapadnoye, a conservative estimate would be 250–500 people per settlement based on 5–10 people if dwellings are actual homes for agro-pastoral families.[71] Shramko also notes differences in structure sizes ranging from 11–63 sq m, with the possibility of some larger structures.[72] Certainly, if the number of labourers needed to build the Bel'sk fortifications are an indicator, the population of each Bel'sk settlement are far fewer than previously believed, and possibly not enough to complete the fortifications in a relatively timely manner (depending on exigent circumstances). To do so, then, would have required labourers from hinterland populations, the existence of which is attested to strongly by Petrenko's study of the Kiev-Cherkassy region,[73] and by Shramko's map of the Bel'sk region.[74] Furthermore, as Daragan notes, living space in terms of settlement area is far less than work space for the other forest-steppe settlements.[75] Bel'sk can then be envisioned as part of a general trend of large sites dedicated to a high degree to the production and trade of goods surrounded by smaller tiers of settlements (towns and villages).

More specifically for population estimates of Bel'sk and their relationship to the labour force needed to complete the fortification wall, there are several possibilities to be considered: 1) the construction of the fortifications took much longer than 5 to 10 years; 2) there were more people living at Bel'sk than what we can account for here, per Shramko;[76] or 3) hinterland or rural populations contributed to the effort given that maybe they were occupying the open space in the complex in times of conflict. Based on the recent isotopic work conducted by the Bel'sk project,[77] a small number of individuals interred in the Bel'sk cemeteries came from up to 90 km away, whereas most individuals analysed were local. This study indicates that the broader social catchment might have provided the labour force necessary to construct the fortifications in a relatively short time, but that the socio-economic context in which this occurred remains a mystery. These possibilities need to be explored using more detailed and different methodologies, including expanding the isotopic analyses, systematic regional survey and surface collection, remote sensing and further geoprospection. What seems certain is that Bel'sk and some of the other large fortified settlements such as Trakhtemirov served as *entrepôt* with the intention of shipping various goods to other staging points or for eventual trade with various Greek colonies such as Berezan and Olbia, raising additional questions about the nature of urbanism in the forest-steppe, and the ostensibly changing roles of the steppe Scythians in the growth of these settlements.

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[68] Shramko 1984: 225; cited in Daragan 2017*b*: 398.
[69] Bessonova and Skory 2001: 22–32.
[70] Shramko 1987.
[71] See Johnson 2014 for explanation of size of pastoral/agro-pastoral families.
[72] Shramko 1987.
[73] Petrenko 1989.
[74] Cf. Rolle, Murzhin and Shramko 1996.
[75] Daragan 2017*b*.
[76] Shramko 1984.
[77] Ventresca Miller *et al.* 2019.

The predator scene in Scythian 'Animal Style' as a socio-political indicator

Vladimir A. Kisel[1]

Abstract

The main theme of the Scythian 'Animal Style' is that of a confrontation between beasts of prey and ungulates, i.e. scenes of predation. The history of the 'Animal Style' can be divided into three stages. Stage 1 dates to the 9th to mid-6th centuries BC, when nomadic societies were chiefdoms: there are no scenes of predation, only the domination of beasts of prey over herbivorous animals. Stage 2 dates to the second half of the 6th to the first half of the 4th centuries BC, the formation of the nomad empire: it sees the appearance of scenes of beasts of prey attacking ungulates which meekly accept their fate. Stage 3 dates to the mid-4th to 3rd centuries BC, a period of decline of Scythian-type cultures and onset of anarchy: it is characterised by beasts of prey devouring ungulates, attacking each other, ungulates struggling with beasts of prey or fighting one another. It is clear that the predator motif was an indicator which records crucial moments in the transformation of the socio-political structure of ancient nomadic society.

Keywords: Ancient nomads; 'Animal Style'; predator motif; socio-political system

'Animal Style' is a complex and, in many ways, still not fully understood feature of ancient nomadic culture. Its origin is most likely connected with the warrior concept and doubtless artefacts in this style reflected beliefs current in nomadic society at that time. However, researchers are still unable to agree as to what specifically was meant by the main protagonists in this type of art which consist of deer, mountain goats, elks, camels, horses, boars, big cats, wolves, bears, hares and birds of prey. These images may have represented totems, magic symbols or signs of a mythological system.[2] The main theme or clash of the 'Animal Style' was conflict of beasts, between prey and ungulates, known in modern literature as the 'predator motif'.

It is a well-known fact that art, as a reflection of life, reacts sharply to changes in mythological or religious systems and in the social structure of society. 'Explaining a style means nothing other than including it in the general history of its age and proving that its forms speak the same language as the other components of its time', wrote Heinrich Wölfflin.[3] A similar thought in relation to the 'Animal Style' was expressed by Mark Podolsky: 'The Scythians' animals directly reflected their perception of life at that time'.[4] An argued basis for regarding ancient art as a 'mirror' of the state of society was adduced by Sergey Sorokin, who analysed the decorative style of various objects from the ancient world, in particular the works of nomads, and argued persuasively that the structure of ornamental compositions can indicate the socio-political system of the culture which produced them.[5]

'Animal Style' was not a frozen or static form of pictorial art. Throughout its history it was dynamic and receptive to external influences which led to substantial stylistic changes. Moreover, it was not only the images and the ways in which they were interpreted that changed, but also the basic compositions and scenes themselves. The most vivid and eye-catching examples of 'Animal Style' were scenes of wild beasts tearing apart and devouring ungulates. These scenes most probably embodied the principles of world order as seen by the ancient nomads and combined concepts of rebirth through death and reincarnation.[6] Despite this extraordinary significance, such scenes did not become a fixed canon but were subject to substantial metamorphoses.

Distinctly defined scenes of predation are not encountered in the early stage of the Scythian 'Animal Style' which dates approximately from the 9th to mid-6th centuries BC.[7] During this period, according to Dmitry Machinsky's accurate observation (oral communication), predation was intimated rather than specifically depicted. This is reflected in many artefacts in which static figures of wild beasts, primarily large

[1] Peter the Great Museum of Anthropology and Ethnography (Kunstkamera), 3 University Embankment, St. Petersburg 199034, Russia; email: kisel@kunstkamera.ru

[2] Khazanov 1975*a*: 82–83; Cheremisin 2008*a*: 8–24.

[3] Wölfflin 2004: 144.

[4] Podolsky 2010: 179.

[5] Sorokin 1978: 176–81, 188–89.

[6] Korolkova 2006: 129–30, 132.

[7] All the dates given are relative. They do not reflect the period when specific artefacts were made but instead designate the periods of development of the 'Animal Style'. It must also be remembered that socio-cultural processes in the Eurasian zone of the steppes did not occur simultaneously and while some parts of the nomadic world were developing rapidly, others were dragging their feet.

Figure 1. Scenes of domination of herbivores by beasts of prey: 1, iron arrowhead with gold decoration, 7th century BC, L 4.1, W 1.3 cm, Tuva, Arzhan-2 (The State Hermitage Museum, St. Petersburg, inv. nr. 2917/25); 2, bronze dagger, 8th–7th century BC, L 21.8 cm, southern Siberia (The State Hermitage Museum, St. Petersburg, inv. nr. 5544/23); 3, bronze knife, 8th–7th century BC, L 17.5 cm, Minusinsk Basin, Ust-Abakanskoye village (The State Hermitage Museum, St. Petersburg, inv. nr. 5531/976); 4, gold overlay for a *gorytos* (?), 7th century BC, L 40.5, W 22.2 cm, Kuban, Kelermes kurgan 4 (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1904 1/28); 5, bronze pommel, 6th century BC, H 26.5, W 18.5 cm, Kuban, Ulyap kurgan 2 (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1909 1/111)

felines, are shown baring their teeth at hoofed animals, pursuing their prey or attacking them but not devouring them (Figure 1), or in other cases where beasts or birds of prey are depicted next to part of a dead ungulate, they are shown at some distance away from their prey. The impression is that the nomadic masters saw their task as being to show the indisputable domination of fierce animals over herbivores, and establishing a distinction in the world between the strong and the weak.

It is generally accepted that ancient nomadic societies were chiefdoms.[8] These were probably fragile formations based on tribes or groups of related tribes. These may have been closely linked by means of various contacts, but lacked political organisation. Such formations usually had a single ideological system, common cults and rituals, and in a dynamic situation could merge or unite in loose confederations.[9] For example, according to Anatoly Khazanov, Scythian society at that time was an inter-tribal military-hierarchical union of a primarily nomadic character.[10] The status of leader in this political structure depended, as a rule, on a man's personal qualities and luck. In the early years of such chiefdoms there was no inheritance of power and no monopoly on the use of force. Virtually all these

[8] Kradin 2007: 112–13.

[9] Grinin and Korotaev 2013: 39.

[10] Khazanov 1975*b*: 217.

Figure 2. Scenes of wild beasts devouring their prey: 1, felt and leather saddlecloth, 4th century BC, L 119, W 60 cm, Altai mountains, Pazyryk mound 1 (The State Hermitage Museum, St. Petersburg, inv. nr. 1295/150); 2, wood and leather pommel, 4th century BC, H 27 cm, Altai mountains, Pazyryk mound 2 (The State Hermitage Museum, St. Petersburg, inv. nr. 1684/170); 3, horn case, 4th–3rd century BC, L 5 cm, Tuva, Aymyrlyg VIII, structure 4 (The State Hermitage Museum, St. Petersburg, inv. nr. 2940/1); 4, gold belt plaque, 4th–3rd century BC, L 19.3 cm, Siberian Collection of Peter the Great (The State Hermitage Museum, St. Petersburg, inv. nr. Si.1/6); 5, bronze plaque, 5th century BC, L 7.7 cm, Minusinsk Basin, Askyz village (The State Hermitage Museum, St. Petersburg, inv. nr. 5531/1396)

features are indicated in the 5th century AD Chinese chronicle *Hou Hanshu* which describes the northern barbarian nomads of former times: 'Whoever is brave, strong and able to sort out disputes, they are made elders. They have no inherited succession. Each camp has its own leader ... War is an important matter'.[11] Archaic artefacts in 'Animal Style' apparently recorded a state of society in which violence was permissible yet regulated.

During about the mid-6th century BC substantial changes took place in the Eurasian zone of the steppes. This is reflected in the archaeological record by new types of armour, utensils and horse harness.[12] It was at this time that what we now regard as typical scenes of predation started appearing in 'Animal Style'. This is how Mikhail Artamonov has characterised this new phase:

> 'The new style in art is distinguished by dynamism and expressiveness of images, the spread of compositions featuring fighting animals and, along with this, the reinforcement of ornamentation with a corresponding schematisation of real life forms

[11] Bichurin 1950: 142–43.

[12] Alekseev 2003*a*: 169–175; Shulga 2013*a*: 321–22.

> ... Animals in peaceful static poses are replaced by numerous depictions of beasts in energetic movement'.[13]

Wild beasts were now depicted gnawing at the bodies of hoofed animals and devouring their prey, while the ungulates meekly accepted their fate (Figure 2), and 'in such scenes there is no sympathy for the animal doomed to death'.[14] The new imagery should be considered as proclamatory, asserting the absolute and all-embracing power of aggressive beasts.

Some researchers have explained the appearance of such scenes as loans from Greek art, as the Scythian world became closely acquainted with the culture of ancient Greece during the late 6th century BC.[15] This hypothesis certainly holds for those works created by nomads in areas either in direct contact with Greek colonies or relatively close to them, but does not explain the abundance of similar scenes across the enormous expanses of the Asian steppes where there was no Greek influence. A more important factor than acquaintance with the art of ancient Greece is that nomadic society was entering a new stage of social organisation at that time and was evolving to more complex chiefdoms.[16] Researchers believe that during the 6th century BC the Scythians formed a nomadic empire[17] or an early state.[18] As may be concluded from Herodotus' *Histories*, written a century later, the Scythian kingdom which was formed by then was cohesive, had a tripartite structure and included territories inhabited by agricultural tribes who were taxed by tribute.[19] The words of Herodotus are informative, namely that the lands called 'Royal' are because 'the Scythians who live in them are braver and more numerous than elsewhere, and take for granted that every other Scythian is their slave'.[20]

The move of Scythian society to a new level of development was clearly facilitated by numerous military conflicts.[21] The declaration of a Scythian in Lucian of Samosata's *Toxaris [Friendship]* is instructive: 'We are constantly at war – we are either attacking others or withstanding attacks, or entering into skirmishes over pastures and booty'.[22] Incidentally, archaeologists place the height of Scythian aggression at the turn of the 6th and 5th centuries BC.[23]

At this time violence on the European steppes changed in character. The customary right of the strongest was monopolised by one or several nomadic clans – by 'royal Scythians' according to Herodotus. The eminent families became the only possessors of absolute power over the surrounding tribes and were able to suppress and subordinate all their weaker neighbours. It is evident that something similar also occurred in the Asian part of the steppes, although the absence of any detailed written evidence makes it impossible to reconstruct the situation there. However, it cannot be excluded that Herodotus' work contains information relating to Asian as well as European nomads, since some of his reports are not corroborated by archaeological finds in the northern Black Sea region whereas material evidence has been found in southern Siberia and central Asia.[24] One can say that scenes of predation from that period reflected the formation of a fairly rigid political structure, proclaiming the absolute triumph of beasts of prey with total violence towards all herbivores.[25]

The third stage in the 'Animal Style' evolved between the second half of the 4th and the 3rd century BC. The art of the ancient nomads now became enriched by new images and, for example, the number of real animals increased to include yaks, snakes and hedgehogs. The range of representatives of the feathered world also became broader. The former fantastic creatures – griffins, horned birds and beasts of prey, winged lions and horses, deer with antlers in the shape of birds' heads – were joined by various dragon-like monsters, ungulates with beaks and winding snakes instead of horns and tails, and wolf-like creatures with tails and horns ending in birds' heads. The scenes of predation were also transformed: now the wild beasts not only devoured hoofed animals but also started attacking one another (Figure 3). The hoofed animals in their turn began to confront the wild beasts (Figure 4.1), although it is not clear who would be the winners in these fights, and herbivores even began fighting amongst themselves (Figure 4.2).

In Anatoly Khazanov's opinion the explanation of the metamorphoses in the 'Animal Style' 'should be sought in the political upheavals experienced by Scythia at that time'.[26] Certainly the situation in Scythian society in the last third of the 4th century BC was unstable, major military campaigns had exhausted the kingdom and negative socio-economic factors had manifested

[13] Artamonov 1971: 29.
[14] Khazanov 1975*a*: 65.
[15] Khazanov 1975*a*: 52, 64–65.
[16] Kradin 2006: 505–506.
[17] Kradin 2006: 492.
[18] Khazanov 1975*b*: 238; Grinin 2006: 98–99.
[19] Khazanov 1975*b*: 229–36.
[20] Herodotus, *The Histories* 4.20; cf. Dovatur *et al.* 1982: 107.
[21] Khazanov 1975*b*: 233–34, 244–45; Persic 1994: 217; Grinin and Korotaev 2013: 48–50.
[22] Lucian *Toxaris* 36 (Garkavts ed. 2005: 321).
[23] Alekseev 2003*a*: 207.
[24] Kisel 2015*a*: 412–14.
[25] A parallel can be drawn with Hesiod's *Theogony*. According to Alexey Losev, the titanomachy in *Theogony* 'symbolizes the struggle of blind, pre-moral, purely natural elements (these are the titans themselves) with rational-volitional and ubiquitously regulatory human power (in its utmost generalization it is the Olympic pantheon headed by Zeus)'. On the whole, titanomachy is 'a symbol of the regulation of the whole cosmos' (Losev 1976: 206).
[26] Khazanov 1975*a*: 81.

Figure 3. Scenes of animals fighting: 1, gold belt plaque with turquoise, 4th–3rd century BC, L 15.1, W 10 cm, Siberian Collection of Peter the Great (The State Hermitage Museum, St. Petersburg, inv. nr. Si.1/3); 2, gold belt plaque, 4th–3rd century BC, L 11.7, W 7.3 cm, Siberian Collection of Peter the Great (The State Hermitage Museum, St. Petersburg, inv. nr. Si.1/13); 3, gold belt plaque with turquoise, 4th–3rd century BC, L 14, W 8.5 cm, Siberian Collection of Peter the Great (The State Hermitage Museum, St. Petersburg, inv. nr. Si.1/150); 4, gold belt plaque with turquoise, 4th–2nd century BC, L 12.5, W 6.8 cm, Siberian Collection of Peter the Great (The State Hermitage Museum, St. Petersburg, inv. nr. Si.1/159)

themselves. The result was the comparatively rapid break-up of 'Great Scythia'.[27] This general disintegration was intensified when Sarmatian tribes invaded Scythian territory. Diodorus Siculus wrote that the Sarmatians 'became powerful and ravaged a large part of Scythia, and destroying utterly all whom they subdued they turned most of the land into a desert'.[28] At the same time the Huns (Xwn) entered the political arena in the east. According to the Chinese historiographer Sima Qian, the Huns – who valued courage and strength and despised the old and weak – hastened the demise of the confederation of the Yuezhi, who were Scythian in culture. Comparatively quickly 'the Xwn became fantastically stronger, subdued all the northern barbarians and began to rival the Middle Kingdom in the south'. As a result, 'all the people who used bows and arrows were united in one family'.[29]

Some archaeologists cast doubt on reports in written sources relating to the destructive role of the Sarmatians and Huns, instead attributing global ecological upheavals as the main cause in Scythian decline: whatever the reason, the Eurasian steppe now experienced huge and radical changes, many areas became depopulated and, according to Sergey Polin, 'a break occurred in the development of virtually all

[27] Khazanov 1975*b*: 245–46; Alexeev 2003*a*: 242–44, 248–51.
[28] Diodorus, *Library of History* 2.43.7.
[29] Sima Qian, *Records* 323, 329, 333.

Figure 4. Scenes of animals fighting: 1, fragment of carpet, felt, silk, 1st century, Mongolia, Noin-Ula burial ground, kurgan 6 (The State Hermitage Museum, St. Petersburg, inv. nr. MP-1956); 2, copper alloy belt plaque, 2nd–1st century BC, L 12.3, W 5.5 cm, Minusinsk Basin, Oznachennaya village (The State Hermitage Museum, St. Petersburg, inv. nr. 1126/215)

Scythoid cultures'.[30] It seems that a situation described by Thomas Barfield arose in the 3rd century BC: 'When the system was destroyed and the leaders of local tribes became independent, the steppe returned to anarchy'.[31]

The art of the nomads in this final period gives the impression of spontaneity, a mixture of priorities and the disintegration of the previous order. Nobody was now guaranteed a place in the sun which instead could be attained only by the strongest and by means of a cruel and bloody struggle. Late examples of the 'Animal Style' not only reflect the danger and unpredictability of the period, but also indicate the beginning of the end of ancient nomadic art and its fundamental transformation whereby images of animals were replaced by floral motifs. It can be concluded therefore that the predator motif in 'Animal Style' was a genuine indication of the most important transformations in the socio-political structure of ancient nomadic society and of watershed events which took place on the Eurasian steppe.

[30] Polin 2017: 237; see also Polin, this volume.
[31] Barfield 2006: 430.

‘Animal Style’ art: influences and traditions in the nomadic world

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Abstract

The ancient Eurasian nomadic world was a heterogenous conglomeration of peoples and cultures in a highly permeable and receptive environment. These nomads borrowed stylistic forms from different artistic traditions and incorporated them into their own mythological and ideological concepts to create what we term Scythian ‘Animal Style’ art. The diversity of sources of inspiration reflect the fact that these nomads inhabited a vast region between different cradles of civilisation (China, Iran, Mesopotamia, Anatolia, Greece). Southern Siberia can be considered as the regional focal point for ancient cultural interactions between these different tribes during the 1st millennium BC. This paper explores this problem, discusses several individual pieces from the Siberian Collection of Peter the Great and points out how some are closely influenced by Achaemenid and earlier Assyrian aesthetics.

Keywords: ‘Animal Style’; art; impacts; tradition; stylisation; culture; Scythian; Sarmatian; Siberia; nomadic

Introduction

Different historical ethnoses have different artistic traditions of style and technique, as well as the use of different materials, whether in metal or textiles. Technological and stylistic features may be reliable indications which help distinguish different ancient ethnic groups, especially in the absence of written sources. In this case, the remains of their material culture are the only, yet still reliable, source for its investigation, attribution and dating. It must be emphasised that until now the questions concerning the development of Scythian ‘Animal Style’ have not been studied in conjunction with artistic style and technique of manufacturing, despite the great potential of such an integrated study.[2]

The Siberian Collection of Peter the Great is the earliest archaeological collection of any kind in Russia and contains about 240 gold artefacts, including symmetrical belt plaques of different shapes, torcs, bracelets and other items of personal adornment (Figure 1).[3] They are unique but heterogeneous as they span different cultural and technological traditions and origins. They date from the Scythian (*c.* 9th–3rd centuries BC), Achaemenid (6th–4th centuries BC), Sarmatian (*c.* 2nd century BC–4th century AD) and medieval periods. This collection provides a particularly important source for understanding Scythian and Sarmatian culture, and the links and contacts of these early nomads. Exhibiting considerable cultural, chronological, stylistic and technological variety, this treasure is of great scientific significance – not only for Russian scholars but also for international colleagues – to the extent that it could be regarded as a nodal collection: the fact that all are unquestionably authentic is of huge additional significance for their scientific investigation. However, their provenance and attribution are still heavily debated, particularly in light of the absence of any archaeological context or indeed any precise data on their findspots, a problem compounded by their gradual acquisition and subsequent museum transfers.

The Siberian Collection of Peter the Great

The objects from this collection were found somewhere in the vast territory of southern Siberia during the early 18th century by looters who opened ancient burial mounds of different periods. The only way now to determine the cultural origin and date of each item is to compare their stylistic features and details of manufacture with other objects, ideally of clearer provenance and date. Due to recent collaboration between the British Museum and the State Hermitage Museum we were able to undertake a detailed scientific examination of the 15 objects displayed in the exhibition *Scythians: warriors of ancient Siberia*.[4] The physical characteristics and methods of manufacture of these artifacts were studied using non-destructive analytical techniques, including X-radiography and optical microscopy. Some were examined in detail for the first time, whereas in other cases we have the opportunity of comparing the results with the conclusions of specialists from the Hermitage who

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[2] Rudenko 1962*b*; Farkas 1973; Artamonov 1973; Mordvintseva 2003.

[3] Korolkova 2017*a*.

[4] See Korolkova and Mongiatti, this volume.

Figure 1. View of the Siberian Collection of Peter the Great displays in the Treasury, State Hermitage Museum, St. Petersburg

Figure 2. Gold belt plaque with dragons, Siberian Collection of Peter the Great, 2nd–1st century BC (The State Hermitage Museum, St. Petersburg, inv. nr. Si.1727/157)

studied them before. This joint investigation allows a much clearer understanding of the manufacturing technology of these ancient objects and a wide variety of gold-working techniques was identified.

The most valuable results of this work were an opportunity to compare technological features of objects in the Siberian Collection of Peter the Great with Scythian-related gold items of personal adornment in the Oxus Treasure in the British Museum. Since some of the objects from both collections show strong resemblance in style and technique, we can suppose that they were produced in the same region, most likely in related centres of manufacture during the *c.* 4th century BC. All items are closely connected with Achaemenid goldsmithing, especially the use of hammered gold sheet. Another group of Siberian gold objects which were cast using cloth during the manufacturing process is of a completely different tradition which is more closely related to the cultural traditions of goldsmiths from northern China, and these particular belt plaques are very similar to those from Ordos (Figure 2).[5]

Gregory Borovka was certain that there were close mutual relations between China and the centre of the mature Scytho-Siberian 'Animal Style'. He wrote that the initial epicentre of Scytho-Siberian 'Animal Style' 'is to be sought in high northern latitudes'.[6] However, this assertion is evidently a misunderstanding which is impossible on ethnic, cultural and geographical grounds, and may be a mistake in translation. He supposed that the Altai region was not the cradle of the original 'Animal Style' but the great centre of its expansion and development when it had attained maturity. He stressed the enormous importance of connections existing between the Scythian world and ancient China during the formation of 'Animal Style' art.[7] His opinion is true yet we should recognise at least two vectors of cultural and artistic influences on 'Animal Style' art, one from northern China and the other from the Iranian world. The only region where the styles, as well as the gold-working techniques, of the Iranian world, central Asia and northern China met was southern Siberia – including the Altai region – and the existence of local gold-working workshops in

[5] Boardman 2010: pls 52–55.

[6] Borovka 1928: 88.

[7] Borovka 1928: 7.

this region should not be excluded. At the same time, the personal ornaments from the Siberian Collection of Peter the Great show some common iconographic features which cannot simply reflect imports. The interaction of nomad and sedentary societies is a major feature of antiquity: nomads adopted certain features of sedentary culture, transformed these according to their own necessity and, being mobile, were able to transfer them far from their place of origin.

The ancient Eurasian nomadic world was a complex mix of peoples and cultures within a highly permeable environment which was extremely receptive to foreign influences. The nomads borrowed designs and iconography from other peoples and wove them into their own mythological context. Despite generally being an artistic phenomenon characteristic of the Scythian world, Scythian 'Animal Style' does not represent a single artistic tradition but had many sources and versions. This great Scythian region was not only traversed from west to east but was also crossed by nomadic passes linking north and south. Southern Siberia lay within a territory intersected by different routes, and populated by mobile nomads who were highly susceptible to external cultural influences, especially in 'Animal Style'. Eurasian nomad culture therefore shows clear signs of different influences from other cultures which belonged to settled societies, including those of China, Iran and Greece, and we sometimes find features combining Persian and Chinese stylistic traits within a single object. Southern Siberia can therefore be considered a contact zone, a space at the margins of direct political control by external states and a place where local ideas and practices were constructed trans-culturally.[8] The exchange of ideas, technologies and peoples was a characteristic feature of this zone.[9]

The main difficulty when dealing with objects from the Peter the Great Collection is their unknown provenance which makes it impossible to specify the cultural centres or nomadic groups involved in their manufacture. The gold was found in graves located somewhere within the area between modern Kazakhstan and the Altai mountains. The various personal ornaments among the finds may have come from the region between the Irtysh and Ob' rivers, and some even as far as the region of the Syr Darya and Amu Darya, and we can suppose that in addition to Iranian cultural centres with highly developed goldsmithing workshops, there were other local workshops within southern Siberia, probably in the Altai region, where some of the belt plaques in 'Animal Style' may have been cast or hand-made from sheet.

The unique collection of pairs of symmetrical belt plaques and other ornaments show a variety of goldsmithing techniques with casting, hammering on the back, and hammering gold sheet over a matrix. Some of the cast objects from the Siberian collection also show textile impressions on the reverse and this method of casting can be compared with a central Asian tradition.[10] However, ornaments made in the same way sometimes show great differences in style, and evidently belong to different chronological groups. A pair of plaques with a hunting scene is one case (Figure 3). This belt set dates from the late 3rd–2nd centuries BC and shows a late variant of this type of personal adornment.[11] Moreover, being cast with textile, like most of the belt plaques from the Peter the Great Collection, this set is characterised by another artistic style and the unusual technique of inlaying with blue glass imitating turquoise. This glass has a rare composition: it contains too little barium to be considered Chinese yet its origin is still an enigma. Anthropomorphic images in these scenes are quite similar to those on rectangular bronze belt plaques in the Museum of Asiatic Art in Berlin,[12] the Xiwenguo Zhai Collection,[13] and the V&A in London.[14] These belt plaques with a scene showing two horses and a pair of wrestling Asians were found near Xian or in northern China, but are hardly Chinese, nor do the figures have a Chinese appearance.[15]

Another pair of belt plaques which differ in style, and were hammered rather than cast, demonstrate another cultural tradition (Figure 4). Despite the opinion of some scholars that the B- and P-shaped forms of the belt plates without frames are evidence for an early date for this category of belt ornaments,[16] there is no reason to suppose that this is true of all as it does not give the opportunity to date individual objects, as in case of the plaques with boar-hunting scenes which are obviously later then some other plaques of the same shape. Belonging to culturally similar nomad groups, these items demonstrate that there were many different iconographic versions with different technological peculiarities. Evidence for this can be clearly traced in the art of 'Animal Style' of the Scythian period, both in artistic style and technique.

It should be noted that the colourful applied art of the Altai nomads of the Scythian period, represented by objects of different organic materials, is extremely resonant of the aesthetic of Achaemenid Persian polychrome jewellery. The coloured textiles, felts and leather items found in the Altai region are typical

[8] Ferguson and Whitehead 2005: xii.
[9] Linduff 2006: 358–70.
[10] Rudenko 1962*b*: 29–33; Bunker 1988: 222–27; 1993: 25–50; Minasyan 2014: 404–407.
[11] Bunker 2002: 35; Rets 2004.
[12] Wagner and Butz 2007: 86–87 (inv. nr. 1965-27).
[13] So and Bunker 1995: 90.
[14] Boardman 2010: 77, pl. 51 cats 383–84 (V&A, inv. nr. 180-1951).
[15] Boardman 2010: 77, cats 381–84.
[16] Artamonov 1973: 163.

a

b

Figure 3a-b. Gold belt plaques with a boar-hunting scene, Siberian Collection of Peter the Great, 2nd–1st century BC (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727–1/69, 1/70)

a

b

Figure 4a-b. Gold belt plaques with animals fighting, Siberian Collection of Peter the Great, 4th–3rd century BC (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727–1/5, 1/6)

of this culture. Some of the types of objects and techniques may have been borrowed by nomad tribes from different cultural sources, but only where they accorded with their own sense of taste and conformity with their own traditional meaning.

However, none of the cultures with whom Eurasian nomadic tribes were in contact possessed anything comparable to so-called Scythian 'Animal Style' art. They adopted some features, types of ornament, zoomorphic motifs and animal images which were consonant with their own ideological and mythological concepts. Relations with peoples occupying different parts of Eurasian steppe zone remained for a long time a source of the exchange of artistic ideas and elements which formed different versions of 'Animal Style' and different peoples certainly practised a kindred art with a shared mythological and ideological ground. The so-called Scythian 'Animal Style' shows the presence of different stylistic forms and artistic traditions, but its meaning, content and imagery remained quite uniform over a vast territory. The region of southern Siberia can be considered as the focal point for ancient cultural interactions between different Asiatic peoples and nomad tribes in the 1st millennium BC. We should try to trace the cultural impulses in style and technique elements of 'Animal Style' of the Scythian period among the Siberian gold and the objects from the Altai region although this is a complicated task as the cultural links may have been quite indirect.

The gold ornaments from the Siberian Collection of Peter the Great are undoubtedly objects of as much artistic merit as those of wood, leather, fur and other organic materials found in the Altai kurgans. Both categories occasionally show very similar decorative elements, motifs and images, despite the differences of material. There is no reason to suppose that all of the objects in 'Animal Style' found in the Altai kurgans were imported or produced by foreign craftsmen, as a specific artistic style common to different categories of objects may be local. Many objects made of different materials found in Scythian period kurgans in the Altai show strong resemblances with the art of Achaemenid Iran, and this is particularly true of pieces from Pazyryk kurgans 1 and 2. Some were undoubtedly imported from the territories of the Achaemenid empire but there are no grounds to consider all to be imports. This art was inspired by the influence of Iranian art and we can find some very typical features borrowed from Iranian culture which were in nomadic 'Animal Style'. It is of great interest that at the same time, and even on the same objects, we can find images of griffins in the Altai. These representations derive from ancient Greek culture but reached Siberia indirectly. They first appeared in the Altai region no earlier than the 4th–3rd centuries BC, and were not widely disseminated in Siberia. They occur in Pazyryk 'Animal Style' and embellish details of horse trappings, including saddle-cloths, and perhaps were regarded as analogous to the local Siberian tradition of rendering monsters which combined the features of different species, namely beasts-of-prey, deer, eagles and other creatures. These are more typical of the eastern part of the 'Animal Style' region and never occur in European Scythian art. The Siberian 'Animal Style' monsters are similar to griffins, but never possess the lion's body as in Greek mythology, and may have been regarded as a mythological eagle.[17] However, the Pazyryk griffins differ from both Greek and Persian versions as they have their own distinctive features which have a specific ornamental element: a geometric motif in the shape of a combined triangle with a circle on the hindquarter or shoulder of the monster's body. This motif is not of Greek origin and instead points to ancient Near Eastern influence.

Some objects from the Siberian Collection bear clear influence of Achaemenid Persian art and we can single out a group of personal ornaments with similar specific decorative motifs. The most splendid and typical is a gold torc with lion-griffin terminals. This form of monster closely resembles Iranian imagery represented on Achaemenid glazed brick facades from the palace of Darius (*c.* 550–486 BC) at Susa and elsewhere.[18] The treatment of cloisonné technique is identical to that on a pair of gold armlets from the Oxus Treasure, as was noted in their catalogue by O.M. Dalton who concluded that these objects were not only contemporary but also very closely related (Figure 5).[19] He suggested that either the torc travelled north from the border of the

Figure 5. Gold armlet, 5th century BC, Oxus Treasure (The British Museum, inv. nr. 124017)

[17] Rudenko 1958: 101–103.
[18] Artamonov 1973: 163.
[19] Dalton 1964: 52–53.

Figure 6. Late Assyrian carved stone relief panel from the Temple of Ninurta, Nimrud (after Layard 1853: vol. II, 21)

Achaemenid empire, perhaps originating in Bactria, or that an Achaemenid craftsman migrated to Siberia and continued to practise his work there. Polychrome incrustation executed using a cloisonné technique is typical of Achaemenid Persian art, thus should be considered either a sign of the Iranian origin of the object or of the craftsman who made it even though the question of the provenance of the objects remains complicated.

It cannot be denied that images of monsters are also typical of Achaemenid Iran. However, we should bear in mind that ancient Near Eastern art incorporated multiple sources of its own and the artistic culture of Achaemenid Iran in turn drew on different traditions, including that of Assyria. Thus there is evident similarity in composition between a monster's figure with curved body in relief from the Temple of Ninurta of Assurnasirpal II (884–859 BC) at Nimrud (Figure 6), a plaque in the Oxus Treasure (Figure 7) and the fantastic winged horned beast-of-prey on gold belt plaques from the Siberian Collection discussed earlier (Figure 4). When the Persian Empire was established, its art borrowed from earlier sources, hence Mesopotamian mythological fancy appears in the images of griffins and other monsters in Persian art and then continued in Scythian culture.

Polychrome incrusted personal ornaments are a distinctive feature of Achaemenid material culture which develops from earlier periods and cultures of the ancient Near East. There is reason to believe that the technique commonly described as orfèvrerie cloisonné

Figure 7. Gold plaque, *c.* 5th century BC, Oxus Treasure (The British Museum, inv. nr. 123929)

originated in the ancient Near East where it was typical of Egyptian and Phoenician applied art.[20] It then entered Assyria where finds from the unrobbed queens' tombs in the North-West Palace at Nimrud prove that it was used by Assyrian goldsmiths during the 9th–8th centuries BC,[21] and almost identical items have been excavated more recently in 6th century BC tombs at Jubaji in

[20] Acquaro and De Vita 2009: 114; cf. also Maxwell-Hyslop 1971: 173–74 (Middle Assyrian Ashur).
[21] Mahmoud Hussein 2016.

Figure 8. Gold torc, Siberian Collection of Peter the Great, 4th–3rd century BC (The State Hermitage Museum, St. Petersburg, inv. nr. Z–568)

southwest Iran.[22] Its great development took place in the Achaemenid empire, as evident from sumptuous items of personal adornment from Susa and the Oxus Treasure, and from there entered the Scythian world. The monsters of the Iranian world resemble winged creatures with goats' horns and a beaked eagle-head or lion-head hybrid animal with the body of a lion or an ungulate. Such hybrid figures decorate the terminals of the Hermitage torc (Figure 8). The closest parallels to this torc in terms of style and technique are the pair of armlets from the Oxus Treasure.[23] Despite the opinion of some that it represents Siberian art influenced by Achaemenid jewellery,[24] these objects clearly originated from an Iranian 'Court Circle' workshop although where this was located is uncertain and some believe that it, like the object discussed below, came from eastern Iran.[25]

Another golden spiral torc from the Siberian Collection of Peter the Great has terminals in the form of feline predators, perhaps tigers. This demonstrates a very similar style and is very close in the decorative inlay technique although lacking the cloisonné (Figure 9). This torc probably dates to the 4th–3rd centuries BC. The terminals were embellished with turquoise inlays and the tails of the felines end in griffins' heads; the ears, ribs and other body surfaces were also set with inlay cells for turquoise. The style of this object is comparable with the Pazyryk style, as well as with pieces from the Oxus Treasure and the barrow excavated at Issyk in Kazakhstan. Scholars have defined this torc as an example of native Siberian goldwork influenced by Achaemenid art.[26] At the same time, it should be noted that we cannot consider these two torcs as separate examples of ancient personal adornment and their close relationship is clear as they show a strong resemblance in goldsmithing, despite differences in decoration. The torc with the feline terminals may be considered an intermediate variant between 'Achaemenid Court Style' and a peripheral culture and evidence for the strong Iranian influence in styles of personal adornment in the vast region adjoining the Achaemenid empire. This intermediate link closely connects with nomadic Pazyryk culture. Some scholars supposed that the terminals of this torc were made by casting,[27] but instead it should be noted that the felines were hand-worked on a matrix and made in two parts.[28] In addition to the cloisonné on the neck of the monster, the craftsman used another method to add inlay cells filled with turquoise. Such a technique, in Dalton's opinion, is a simpler method of embedding the stones in cavities made on the metal sheet, and the Sarmatians continued to use both techniques.[29]

A splendid gold ornament from the Peter the Great collection represents a fantastic bird of prey with outstretched wings attacking a wild goat (Figure 10). It seems reasonable to suppose that this scene was of great semantic significance, and analogies from the Altai show similar compositions on decorative elements of horse trappings.[30] However, this object may have functioned as a chieftain's aigrette rather than a frontlet of horse headgear as previously supposed. This aigrette is a rare example in also showing a strong resemblance in style and ornamental details both with armlets in the Oxus Treasure and Pazyryk male headgear recently reconstructed by Elena Stepanova.[31] However, compared with the armlets, the workmanship of the Siberian aigrette appears somewhat coarse in the author's opinion: we should assume the existence of another workshop of the same period and of similar cultural tradition, although all are sufficiently similar to have formed a single stylistic group. One detail is important and that is determining the exact species of prey held in the bird's talons. This is important from the point of view of defining where it was made since it resembles *Capra sibirica*, closely related to the European *Capra ibex*, but which only inhabited some central Asian regions including present-day Tajikistan, Kazakhstan, Afghanistan, the Pamirs, Tien Shan and southern Siberia, implying that it was produced somewhere in that territory. The iconography of this item with a griffin-like monster attacking an ibex is also known on a felt saddle-cloth from Pazyryk kurgan 1. As with

[22] Shishegar 2015: 160–281.
[23] Dalton 1964: 32–34, cat. 116, pl. I (British Museum inv. nr. 124017, V&A inv. nr. 442-1884).
[24] E.g., Rudenko 1962*b*: 18–19.
[25] Ivanov, Lukonin and Smesova 1984: 17, cats 2–3; see also Moorey 1985.
[26] Rudenko 1962*b*: 18; Artamonov 1973: 169; Farkas 1973: 83.
[27] Farkas 1973: 83, Artamonov 1973: 168.
[28] Korolkova and Mongiatti, this volume.
[29] Farkas 1973: 80–83.
[30] Korolkova 2011.
[31] Stepanova 2017: 113.

Figure 9. Gold torc, Siberian Collection of Peter the Great, 4th–3rd century BC (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727–1/62)

Figure 10. Gold aigrette, Siberian Collection of Peter the Great, 4th–3rd century BC (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727–1/131)

other parallels from the Altai, this reflects interactions between Achaemenid Persia and the nomad cultures of central Asia, southern Siberia and Iran.

There are some specific features in the treatment of this object which are of great interest, such as the spread tail of the bird which is rendered with tiny tubular cylinders arranged in vertical rows in the riffles between the feathers. These features were presumably intended for the attachment of inlays (now missing) inserted along the five grooves on the tail feathers. This is a most unusual feature and the only analogy occurs on Phoenician ivories excavated in 'Fort Shalmaneser' at Nimrud and dating to the 8th century BC (Figures 11–12).[32] Some ivory panels, plaques and pyxides from Nimrud demonstrate a very similar method of embellishment: despite the difference in material, date and place of production, the resemblance is so close that there must be a direct relation and we can therefore surmise that this type of decoration on the Siberian ornament ultimately derives from Assyria, just as the cloisonné technique was adopted by Achaemenid Persia. On one of these ivory panels a single piece of green glass inlay remains in the stalk of one of the papyrus flowers (Figure 12).[33] There is a similar example of the same type of incrustation on a small eagle figure from the Siberian Collection where the neck and breast are decorated with cloisonné (Figure 13).[34] This item was inlaid with turquoise and the eagle's tail framed with small cylinders designed to carry other inlays, now missing. The aigrette combines the three methods of polychrome decoration

Figure 11. Phoenician ivory excavated at 'Fort Shalmaneser', Nimrud, 8th century BC (Iraq Museum, Baghdad, ND 10509)

[32] Mallowan 1966: 566–69, figs 513–15; Herrmann 2017: 66, 99, figs 70, 126–27.

[33] Mallowan 1966: 568.

[34] Ivanov, Lukonin and Smesova 1984: 20, cat. 14.

Figure 12. Phoenician ivory excavated at 'Fort Shalmaneser', Nimrud, 8th century BC (Iraq Museum, Baghdad, ND 9475)

Figure 13. Gold eagle with cloisonné decoration, Siberian Collection of Peter the Great, 4th–3rd century BC (The State Hermitage Museum, St. Petersburg, inv. nr. Z–557)

and shows both cloisonné and inlays embedded in cavities which originally accentuated the shoulder and the hindquarter of the goat, as well as presumably small cylindrical inlays on the tail feathers.

During both the Scythian and Sarmatian periods, 'Animal Style' art typically used turquoise or blue glass as a source of inlay whereas lapis lazuli was also used within equivalent ancient Near Eastern objects. To specify the technique it should be stressed that the inlays on the torc were embedded in cavities which were not cut but instead hammered on a matrix. In addition to some common features, including the above-mentioned decorative element in the shape of combination of a triangle with a circle, we might note one more specific feature of the embedding of inlays: a double-line contour outlining the inlay cell. This feature is one of the best indicators of the closeness in style and cultural origin of this group of ornaments.

Investigation and analyses of items from the Siberian Collection of Peter the Great allow us to trace the cultural development of the Eurasian nomad world from Scythian to Sarmatian times as southern Siberia was a centre of both cultures. The latest object to resemble the Scythian-type of belt plaques was found in a 1st century Sarmatian kurgan at Verkhnaya Pogromnoje in the lower Volga (Figure 14). This was made in the same way, i.e. hand-made from sheet and decorated with a distinctive shape of inlay with a double contour line.[35] This belt plaque may be an heirloom and therefore earlier than the grave in which it was found, but is certainly the latest in this group of 'Animal Style' pieces with inlaid geometric motifs with double outline contours. Among the most distinctive features which should be noted here is the workmanship of the plaque, which is relatively coarse, as well as some zoomorphic characteristics and details which were not quite clear to the goldsmith who perhaps had an idea of the design but failed to understand all the details.

There are many parallels to this material in the Oxus Treasure in the British Museum. Recent excavations which add comparative material to the Siberian and Oxus treasures include the Issyk and Berel' kurgans (Kazakhstan) and Takht-i Sangin (Tajikistan). However, the question of origin of the items from the Peter the Great Collection is still far from clear. The most probable centre of production of these personal ornaments may lie in eastern Iran or Bactria but the Altai region possessed much potential for a high developed tradition of manufacture too. Among the items from different collections we can single out a group of ornaments with zoomorphic images which show a strong resemblance in style and technique. This group includes objects of different functions: the above-mentioned torcs, bracelets, a pair of belt-buckles with an animal combat scene showing a winged monster

[35] Korolkova 2009: 48, 54, cat. 69.

Figure 14. Gold belt buckle in 'Animal Style' from Sarmatian kurgan 2 in lower Volga region, Verkhnaya Pogromnoje, 1st century BC (The State Hermitage Museum, St. Petersburg, inv. nr. 1953/23)

attacking a recumbent horse (Figure 3), and a splendid ornament with a fantastic bird of prey attacking a wild goat. All were decorated with coloured stone inlays embedded in cavities within the outlined cells, which are composed in a geometric pattern with a circle in the centre flanked by one or two curved triangles. This type of ornamental composition usually marks the shoulder and hindquarters of an animal, and recurs on leather and felt items from Pazyryk, particularly kurgans 1 and 2, which are generally agreed to have been made under the influence of Achaemenid culture.

Recurring to the subject of the specific group of inlaid ornaments we should mention some other, lesser known, parallels. One is an unprovenanced bracelet from a private collection which has been passing through the London art market since 1981 (Figure 15).[36] This consists of two convex halves, each with an embossed and pierced design of fabulous interlocking beasts rendered in 'Animal Style' with mixed features of different animals, bordered at the top and bottom by a row of U-shaped cells and an outer edge of very fine beaded wire. A separate gold sheet was added to the inside, presumably to add strength and comfort; the bracelet was fastened with a hinged joint of beaded wire tube and secured with a pin, originally attached to a small safety chain which passed through a small hole in the border.[37] The cells in the decoration and border originally contained inlays although none survive. This object doubtless belongs to the same group of ornaments as the objects discussed above from the Peter the Great Collection. Another is a hilt of a dagger or sword with a double feline composition,[38] which is comparable with some ancient Iranian examples as well as much later examples of Indian weaponry: this hilt is unfortunately lost and is only known from a drawing from the Kunstkamera which was made in the 1730s and now preserved in the archive of the Academy of Science (St. Petersburg branch) (Figure 16). Each of these objects carries the imprint of influences of ancient Near Eastern civilisation and continue the development of cultural traditions which derive from Assyria and Achaemenid culture. We still do not know their centre of their production but it evidently lay in territory bordering Iran and the nomadic zone, possibly within central Asia. Traces of different cultural and artistic influences can be observed on jewellery style and technique: the main issue now is to establish how and why such items arrived in southern Siberia, and who produced them, as the question of their provenance is much more complicated.

Conclusions

Archaeological research reveals the extent of exchange of goods, technology and people across the Eurasian steppe, and the close connections between nomad tribes and their sedentary civilised neighbours. Moreover, thanks to archaeological investigations, we can trace the great cultural changes which took place across the vast area occupied by nomad tribes following wars and other social upheavals. In particular, Alexander the Great's campaigns may have been a catalyst for significant change in different areas. We can therefore assume that it was due to these circumstances that this characteristic style of jewellery was found in the graves of nomadic nobles from the 4th–3rd centuries BC.

[36] It was sold at Christie's (1982: 19, lot 105), acquired by Idemitsu Museum of Arts, sold by them on 2nd December 2005 to Alexander Global Art Ltd (Adams ed. 2008: 46–49, cat. no. 11), thence to Aaron Gallery, London, in 2006. We are grateful to the current owner for permission to publish this object and supplying this information.

[37] The original pin and chain are missing and the present pin is a modern replacement.

[38] Korolkova 2017*b*: 53, fig. 2.

Figure 15. Bracelet, late 4th or early 3rd century BC, H 4.6, max D 6.94 cm, wgt 145 g (private collection, London)

Figure 16. Lost dagger hilt, watercolour from the catalogue of drawings, 1730s, Kunstkamera (St. Petersburg branch of the Archive of Russian Academy of Science, 2018: category IX, opus 4, delo 291, leaf 1: centre of the page), 2018

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To accompany and honour the deceased: the horses from the graves of the Pazyryk culture

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Abstract

Sacrificing horses and placing them in graves are standard elements of Scythian funerary practices and recent archaeological projects in Mongolia provide additional evidence of this. These sites complement earlier investigations carried out at the site of Berel' in Kazakhstan. The descriptions of the age, gender, colour and form of sacrifice of these horses allow a better understanding of the criteria of choice, enable a better understanding of why they were selected and underline the primordial place these horses enjoyed during the funerary ceremonies.

Keywords: Sacrifice; horses; graves; Pazyryk culture; zooarchaeology

Introduction

We need to restore to the horses found in the tombs the place and importance they enjoyed during the funeral ceremonies. Notwithstanding their importance when alive, whether as mounts or protagonists of ritual processions – a matter which is difficult to determine precisely – the magnificence and richness of their decoration and harness, as well as the structural and architectural arrangements that their installation in the tombs required, raise questions over the attitude paid to them by Scythian horsemen. The horse was an essential biological component of Iron Age societies and their tombs. It was a food source and indigenous to the steppe and mountain landscape of central and middle Asia. It was also a medium for many artifacts whose study help us understand human groups and their inter-relationships. Horses were also cultural features, and participants in these societies as they were highly regarded and individualised through modifications to their ears and manes, and the addition of spectacular horsegear, probably during their lifetime but also at the moment of their death. Their role and the reason for their presence alongside human burials is difficult to determine: they may have been regarded as sacred animals, psychopomps or spiritual guides accompanying the deceased into the presumed afterlife, or transporters of prayers intended for divinities related to the world of the dead and/or to whom it was necessary to pay respect.

Their placement in the tomb and the nature and attribution of the elements of ornament, in view of all the rites celebrated at the time of the funeral, must have been part of an extremely elaborate and precise scenario, most of which unfortunately cannot be reconstructed as it has not left any material remains. Despite being unable to define, reach or even approach the meaning of their sacrifice, their remains nevertheless inform us about its form and several stages of its unfolding.

Excavations at numerous sites in the Altai and across the steppes of Kazakhstan and Russia have provided a rich literature on the horses and other remains found in these tombs.[4] Recent work conducted in Mongolia by the team led by Ts. Turbat from 2005 to 2012 uncovered many tombs of the Pazyryk culture.[5] For some, as at Berel', these allowed the recording *in situ* of certain data concerning the position of the horses. These data, combined with those recently acquired from genetic analyses of horses from Berel',[6] provide a new opportunity to offer a synthesis and propose some answers to old questions concerning the selection criteria of these animals and their treatment at the moment of their killing. However, it must be admitted that this is research in progress: the description of the elements of harness, arrangement of objects, information concerning the deceased, their age,

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[4] E.g., Derevyanko and Molodin 2000; Francfort and Lepetz 2010; Lepetz 2013; Kozintsev and Samashev 2014.
[5] The excavations were directed by Ts. Turbat (Institute of History and Archaeology, Academy of Sciences) with the collaboration of N. Bayaraa and D. Batsukh within the framework of a programme conducted with P.-H. Giscard. Archaeozoological studies were carried out by S. Lepetz, either in the field or in Ulaanbaatar (with the assistance of K. Debue), on the basis of remains partly or entirely collected by the archaeologists or by the author.
[6] Librado *et al.* 2017.

gender, practices of preservation of the bodies and the modes of decomposition have not yet been published in detail for the Mongolian sites as these analyses are not yet complete and, as far as the Berel' valley is concerned, reference is made to the publications concerning this site, specifically for tomb 11[7] and for the other excavated burial mounds.[8]

What to describe and how to describe?

Analysing faunal remains involves the use of a series of methods, some of which are standard archaeological practice, yet others are restricted to archaeozoological or veterinary disciplines or are specific to individual researchers. Thus, the method of determining the position of individuals in a grave is similar to those deployed by anthropologists who seek to define the initial position of corpses, understand the movement of bones and the history of the body either before its deposition or once it has been transformed into a skeleton. In the same way that it is no longer sufficient just to have a physical description of the humans buried, attention should be paid to the acts which led to the horse being deposited in the pit and to the consequences of the combined effects of the degradation of the body and other organic matter. The excavation and *in situ* observation of animal remains by an archaeozoologist is therefore essential.

The description then recognises the gender and age of the horses. Equid bones have the distinction of having a number of sexual characteristics which are very easy to spot on complete skeletons: females have a very flat pubis whereas males have a very rounded equivalent. The mandibles and maxillae of female horses only very rarely have canines (they are in this case of reduced size), whereas stallions always carry some. Describing buried animals also involves estimating their age. This combined approach can highlight an important aspect of their selection and help better understand the condition, rank and role of horses prior to their sacrifice.

The age of the animals is determined using various easy-to-use and precise methods. One is to evaluate the level of skeletal epiphysation and this allowed Kozintzev to evaluate the age of the Berel' equids through observation of the bones.[9] The other method is to observe the state of tooth eruption and degree of tooth wear: this method is similar to that traditionally used by breeders and horse-traders and provides fairly accurate and relatively reliable results. The horse has two pairs of six incisors on its mandible and maxilla. The eruption and replacement of milk teeth by permanent teeth takes place according to a relatively fixed chronology. Once the adult teeth are present, the wear evolution of these incisors may allow further estimates of age. This is assessed on the basis of criteria such as the contact between the opposing teeth (lower and upper), the extent of wear and the shape that these teeth take with age.

However, it should be noted that the evaluation of the age of a horse has several pitfalls: the first source of variation is related to the reference data-sets used by individual researchers as these may differ. As far as Berel' tomb 11 and the Mongolian burials are concerned, the wear tables were based on tables established for horse-traders and previously published by Cornevin and Lesbre.[10] It should also be noted that the nature of the feed, which may be more or less abrasive, will affect the speed of tooth wear, hence the use of a reference framework established for European horses may not be appropriate for the study of animals with very different living and feeding conditions. Nevertheless, although the speed of wear will vary, the order of successive stages will be similar and therefore a cross-observational approach makes it possible to establish a relative age of the animals, insofar as the diet of Altai horses (whether from Mongolia or Kazakhstan) was more or less similar, if not identical. It is also the case that beyond 10–12 years of age the evaluation becomes more uncertain and the margin of uncertainty increases with the age of the horse. Furthermore, the individual variability of wear should not be under-estimated and pathological anomalies are not rare, factors which may lead to further errors. In short, the values obtained cannot account for all these variables and the ages determined must be considered in relative rather than absolute terms.

Sites recently excavated in the Mongolian Altai

The Pazyryk culture graves excavated in this region by the team directed by Ts. Turbat and P.-H. Giscard have not yet been the subject of final publication but a great deal of information is already available.[11] The excavated cemeteries of Baga Türger 1–3 and 6 (BTG), Tsengel Khairkhan 1 (TSK), Syrgal 1–3 and Khatuu 1–3 are located in the extreme western part of Bayan-Ölgii Aimag (Figure 1) and have yielded 20 graves, from which as many as 36 horses have been studied (Figures 2–3). It is not the place here to describe all the deposits but instead to highlight the archaeozoological characteristics of some of them in order to identify some recurrent features, thus Figure 4 provides previously unpublished information concerning the position of individuals, gender and age, while Figure 15 indicates their affected pathologies.

[7] Francfort, Ligabue and Samashev 1998; Samashev *et al.* 2000*a*.
[8] Kozintsev and Samashev 2014.
[9] Kozintsev and Samashev 2014.
[10] Cornevin and Lesbre 1894.
[11] Turbat *et al.* 2009; Jordana *et al.* 2009; Batsukh 2015; Turbat and Batsukh 2015; Bendrey *et al.* 2017.

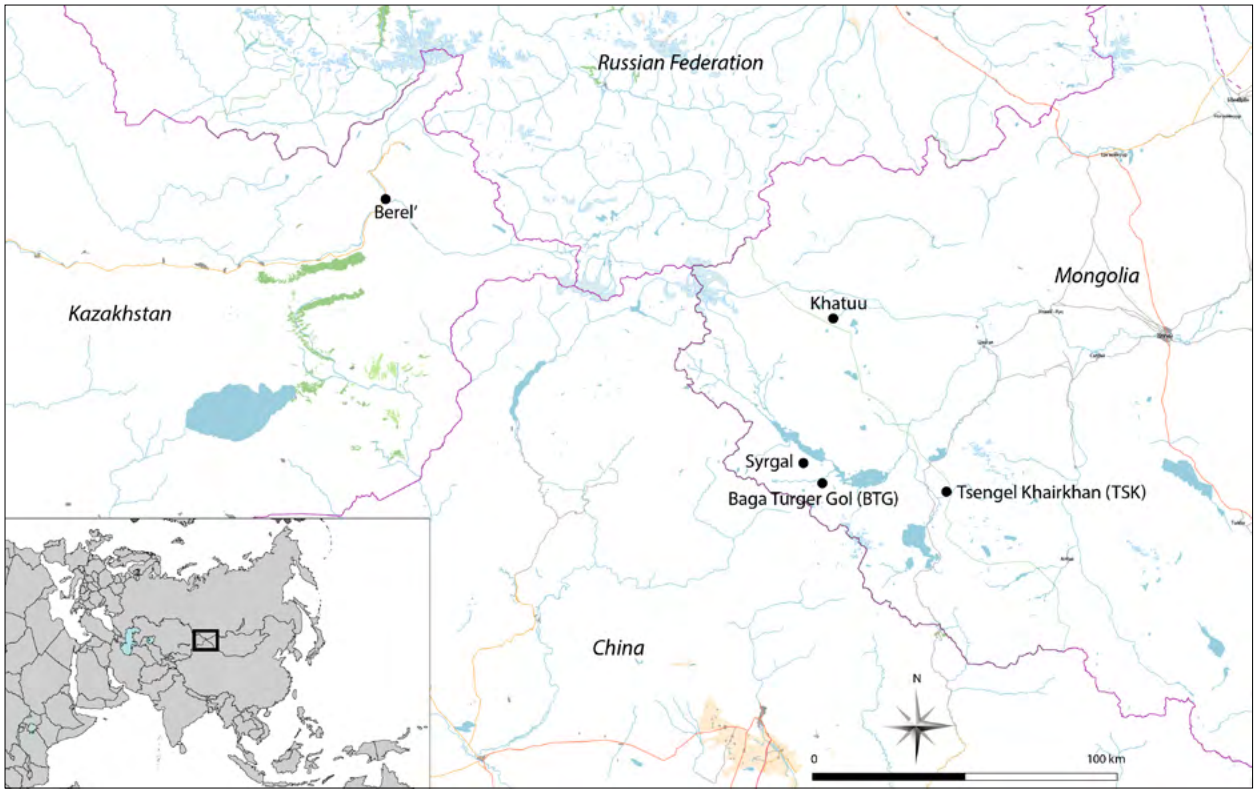


Figure 1. Geographical location of sites

Baga Turger Gol 6: tomb 10

This grave contained a horse in the northwest part of the pit. The heads of both the dead person and the horse face northeast. The animal was placed at the edge of the pit in a relatively confined space. The forelegs, and especially the hind right limbs, slide along the north face. It is a very old adult male, about 1.30 m tall, who was hit by probably two blows from an axe on the left parieto-frontal zone (Figure 5). The diameter of the perforations is approximately 2 cm, but these successive blows created a single large cavity.

Baga Turger Gol 6: Grave 11

This grave contained two horses. Horse A was a male aged about 18 years and about 1.37 m high. It was placed north of the tomb on its right side, with its head orientated in the same direction as the human bodies, i.e. towards the east. Its forelegs were folded under its thorax. Two blows are visible on the right temporal: one is elongated but from an impact caused by a 16 mm diameter rounded object which caused the bone to burst. The other cavity probably has the same origin, but in this case the head profile of the axe is not visible. Many pathological diseases can be observed. On the vertebral train, ankylosing spondylosis affects the vertebral bodies of the thoracic TH12 to TH15, there is a sacralisation of the lumbar vertebrae L5 and L6, and the TH16 to TH18 joint apophyses show strong bone proliferations connecting them to each other. Lesions are also observed on the distal end of the right metacarpus (arthropathy?) and on a humerus. The animal must have had a serious limp if one considers that it also had a particularly bad left knee: a femoropatellar osteoar disease with a very advanced wear of the cartilage led to the formation of osteophytes. Wear was also observed on the femoral trochlea and the articular surface of the patella.

Horse B was placed on its right side and on top of horse A. Its hind legs were strongly folded with its head resting on its right cheek. This horse was a male aged about 17 years and 1.29 m high at the withers. A large break in the left temporal bone and a blow from a 33 mm cutting edge on the forehead illustrate how it was slaughtered. The most posterior impact hit a fragile part, creating a cavity which does not allow the precise nature of the weapon to be determined but the other stigmata is elongated and comes from the edge of an axe; the extraction of the axe head, once the blow was made, caused a distinctive deformation of the bone walls of the wound. The orientation of the impact indicates that the person responsible was standing at the front of the horse, on the right side of the animal's head (if that individual was right-handed) and the weapon struck the forehead of the horse more or less perpendicularly.

Baga Turger Gol 6: tomb 12

The horse was positioned north of the human corpse and the two heads were on the same side of the grave,

Figure 2. Position of human bodies and horses in the main tombs of the Mongolian Altai

Figure 3. Position of human bodies and horses in the main tombs of the Mongolian Altai

looking east. Placed on its belly, the animal had its front limbs folded beneath it and the hind limbs in an open position on each side of the pelvis. Its head rested slightly on its right side. It was a very old male, possibly aged over 20 years, and its size is estimated at 1.37 m. Three perforations, one on the right temporal (14 mm across), the other two on the left temporal (13 mm and 17 mm across) illustrate the means of sacrifice (Figure 6). It should be noted that one of these is located far behind the skull, at the limit of the occipital protuberance, and the tip entered the compact bone by 36 mm which implies considerable force.

Baga Turger Gol 6: tomb 13

The horse from here was located north of the tomb and faced the human remains. It lay on its left flank while the man lay on his right side with his head to the east. The front limbs of the horse were folded against its abdomen and the hind limbs against its thorax; the animal was pressed against the walls of the burial chamber. It was a young male aged about 1 year. A 15 mm diameter perforation at the top of the head at the temporal crest is clearly visible; a second impact was probably made in the same area, just next to and after the first, but fragmentation precludes precise description.

Tsengel Khairkhan 1: Grave 1

The horse was positioned north of the grave with its head facing east. This horse was a male aged about 5 years and 1.35 m in size. It was placed on its belly, face down with its fore and rear limbs folded on each side of

		horse's location in the grave	head's position of the human bodies	head's position of the horse	horse position in the grave	Age of horse (y. o.)	sex	size of horses	number of impacts	shape of impacts	size of impact
Baga Türger 1	tomb 1	in the north	to the west	to the west		1 - 2 y. o.		n. d.			
Baga Türger 1	tomb 2	in the north	to the west	to the west	on the belly	1 y. o.		n. d.			
Baga Türger 1	tomb 8- Horse 1	in the north				3,5 y. o.		n. d.			
Baga Türger 2	tomb 8-Horse 2	in the north	to the west	to the west	various positions	4,5 y. o.		n. d.			
Baga Türger 3	tomb 8-Horse 3	in the north				5-6 y. o.		n. d.			
Baga Türger 6	tomb 3	in the north	to the east	to the east	on the left flank	+ 20 y. o.	male	n. d.	at least 1 impact	circular	16 mm
Baga Türger 6	tomb 8	in the north	to the east	to the east	on the back	+/- 4 y. o.	male	n. d.	?		
Baga Türger 6	tomb 10	in the north-west	to the north-east	to the north-east	on the belly	+ 20 y. o.	male	1,31 m	probably 2 impacts	circular	20 mm
Baga Türger 6	tomb 11-Horse A	in the north	to the east	to the east	on the right flank	+/- 18 y. o.	male	1,39 m	2 impacts	circular	1x16 mm
Baga Türger 6	tomb 11-Horse B	in the north	to the east	to the east	on the right flank	+/- 17 y. o.	male	1,31 m	1 impact	elongated	30
Baga Türger 6	tomb 12	in the north	to the east	to the east	on the belly	+ 20 y. o.	male	1,38 m	3 impacts	circular	14, 13 et 17 mm
Baga Türger 6	tomb 13	in the north	to the east	to the east	on the left flank	+/- 1 y. o.	male	1,25 m	2 impacts		1x15 mm
Khatuu 1	tomb 1	in the north		to the east	on the belly	very old	male	1,39 m	3 impacts	squares	7,8 - 8 et 9 mm
Khatuu 1	tomb 2	in the north-west	north-east	north-east	on the right flank	+/- 19-20 y. o.	male	1,36 m	1 impact	square	11,2 mm
Khatuu 2	tomb 1	in the north	north-east	north-east	on the belly	+/- 19 y. o.	male/gelding	1,29 m	1 or more ?	large perforation	
Khatuu 3	tomb 6-Horse 1	in the north	to the east	to the east	?	very old	male	1,33 m	2 impacts (3 ?)	1 circular et 1 square	11,6 et 14 mm
Khatuu 3	tomb 6-Horse 2	in the north	to the east	to the east	rather on the belly	very old	male	1,34 m	2 impacts	elongated	33 et 36 mm
Khatuu 3	tomb 6-Horse 3	in the north	to the east	to the east	on the belly	very old	male	1,37 m	2 impacts	circulars	14,5 et 14,5 mm
Syrgal 1	tomb 1-Horse 1	in the north	to the east	to the east	on the left flank	+/- 16-17 y. o.	male	-			
Syrgal 1	tomb 1-Horse 2	in the north	to the east	to the east	on the right flank	+/- 17-19 y. o.	male	-	2 impacts	1 square et 1 ? (mixte)	14 mm
Syrgal 1	tomb 1-Horse 3	in the north	to the east	to the east	on the left flank	+/- 16-17 y. o.	male	-			
Syrgal 1	tomb 1-Horse 4	in the north	to the east	to the east	?	+/- 18-19 y. o.	male	-			
Syrgal 1	tomb 1-Horse 8	in the north	to the east	to the east	?	+/- 18 y. o.	male	-			
Syrgal 1	tomb 2	in the north	to the east	to the east	on the left flank	+/- 18-19 y. o.	male	1,32 m			
Syrgal 2	tomb 1-Horse A	in the north	to the east	to the east	on the belly	+/- 19-20 y. o.	male	1,33 m			
Syrgal 2	tomb 1-Horse B	in the north	to the east	to the east	on the left flank	+/- 19 y. o.	male	1,34 m	at least 2 impacts	circulars	
Syrgal 2	tomb 1-Horse C	in the north	to the east	to the east	on the belly and on the right flank	+/- 4,5 y. o.	male	1,42 m	1 impact	circular	15,2 mm
Syrgal 2	tomeb 1-Horse D	in the north	to the east	to the east	on the belly	très âgé	male	1,36 m	1 impact	circular	15,4 mm
Syrgal 3	tomb 1-Horse 1	in the north		to the west	on the belly	+/- 3 y. o.	male	1,31 m	1 impact	angular	15 mm
Syrgal 3	tomb 1-Horse 2	in the north	to the west	to the west	on the right flank	+/- 18 y. o.	male/gelding	1,36 m	1 impact	square	12 mm
Syrgal 3	tomb 1-Horse 3	in the north		to the west	on the belly	+/- 12-13 y. o.	male	1,43 m	more than 2 impacts	1 square et 1 circular	14 mm (square)
Syrgal 3	tomb 1-Horse 4	in the north		to the west	on the left flank	old	male/gelding	1,34 m	?		
Tsengel Khairkhan 1	tomb 1	in the north	to the east	to the east	on the belly	+/- 5 y. o.	male	1,37 m	3 impacts	2x elongated	29 et 23 mm
Tsengel Khairkhan 1	tomb 2	in the north	to the east	to the east	quite on the belly	+/- 19-20 y. o.	male	1,40 m	2 impacts	rather squares	15 et 15 mm
Tsengel Khairkhan 1	tomb 3-Horse A	in the north	to the east	to the east	on the belly, head on the left cheek	2-4 y. o.	male	1,27 m	at least 2 impacts		9,2 et 15 mm
Tsengel Khairkhan 1	tomb 3-Horse B	in the north	to the east	to the east	on the right flank	+/- 10 y. o.	male	1,33 m	1 impact	circular	15 mm
Berel'	tomb 11 -horse A	in the north-west	to the north-east	to the north-east	on the left flank ?	+/- 10,5	male	1,38			
Berel'	tomb 11 -horse B	in the north-west	to the north-east	to the north-east	on the left flank		male	1,36			
Berel'	tomb 11 -horse C	in the north-west	to the north-east	to the north-east	on the left flank	+/- 19-20	male	1,39			
Berel'	tomb 11 -horse D	in the north-west	to the north-east	to the north-east	on the left flank	+/- 16-17	male	1,45			
Berel'	tomb 11 -horse E	in the north-west	to the north-east	to the north-east	rather on the left flank	+/- 19-20	male	1,39	1 impact	circular	12 mm
Berel'	tomb 11 -horse F	in the north-west	to the north-east	to the north-east	on the belly	+/- 18	male	1,35	1 impact	circular	7 mm
Berel'	tomb 11 -horse G	in the north-west	to the north-east	to the north-east	on the belly and on the right flank	+/- 12	male	1,38			
Berel'	tomb 11 -horse H	in the north-west	to the north-east	to the north-east	on the belly and on the right flank	+/- 11-12	male	1,41	1 impact		
Berel'	tomb 11 -horse I	in the north-west	to the north-east	to the north-east	on the belly	+/- 10,5	male	1,38			
Berel'	tomb 11 -horse K	in the north-west	to the north-east	to the north-east	on the belly	+/- 11,5	male	1,39			
Berel'	tomb 11 -horse L	in the north-west	to the north-east	to the north-east	on the right flank	+/- 10,5	male				
Berel'	tomb 11 -horse M	in the north-west	to the north-east	to the north-east	on the belly	+/- 19-20	male	1,4			
Berel'	tomb 11 -horse N	in the north-west	to the north-east	to the north-east	rather on the belly	+/- 13	male	1,37			

Figure 4. Main characteristics of the horses for each of the tombs studied

Figure 5. Perforations on the skull of the horse of tomb 10 at Baga Türger 6

the vertebral axis. The skull has three perforations, two of which are proven to be related to the killing of the animal. A blow was made by the sharp part of an axe on the left frontal in the supraorbital area (32 mm long). A similar blow is visible on the right temporal, near the sagittal ridge (29 mm long). The third perforation does not have a shape which would allow it to be attributed to the sacrifice, although this is more than likely and is located at the level of the right parietotemporal suture, thus in an off-centre zone. The orientation of the first impact indicates that the person responsible stood at the front of the horse, on the right side of the animal's head if this person were right-handed, whereas the shape of the second impact shows that the weapon struck the horse's forehead more axially (Figure 7).

Tsengel Khairkhan 1: Grave 2

The horse was north of the grave with its head to the east and its body placed on its belly. The hindquarters faced slightly south and the hind legs were folded back. The forelegs were extended and passed beneath the body of the animal to the point where the lower legs reached the rear legs. This forced extension was probably caused by the pulling of the body by the head when the dead animal was placed in the grave. It belonged to a male of 1.39 m height, aged about 19–20 years and it had been hit in the axis of the head with an axe. One hole is located on the temporal crest (15 mm), the other is slightly forward at the edge of the frontal bone (15 mm).

Figure 6. Perforations on the skull of the horse of tomb 12 at Baga Türger 6

Figure 7. Perforations on the skull of the horse of tomb 1 at Tsengel Khairkhan 1

Tsengel Khairkhan 1: Grave 3

The two horses from this grave were located in the northern part and faced one another with their heads to the east. The first (horse A) was positioned on its belly, next to the burial chamber. The limbs were arranged on each side of the vertebral axis, while its neck was twisted to allow the head to rest on its left cheek. It was a young male about 3–4 years old and its size can be estimated at 1.26 m. A perforation of 9.2 mm is visible in the axis of the skull a little in front of the sagittal ridge; a second, 15 mm across, is located near the first, on the left temporal. These two shocks, possibly combined with others, resulted in significant depression of the left temporal wall.

Horse B was the second to be placed in the grave as its left fore limb rested on the withers of horse A. It was placed on its right side with its head resting on its right cheek, with the tip of the muzzle touching that of horse A. It was a male aged about 10 years and its size can be estimated at 1.32 m. The animal was hit by a blow carried by an axe to the back of the skull on the right temporal, leaving a rounded perforation of 15 mm.

Syrgal 2: tomb 1

This grave contained four horses. They were arranged north of the burial chamber with their heads to the east. The horses were arranged so that the first animal (A) lowered into the pit was the westernmost animal and placed against the wall of the burial chamber, while the second horse (C) was placed in front of it against the wall. Horse B was then placed on the left side of A, possibly before horse D, which was placed north of C. The first horse may be regarded as 'closing the funeral convoy', was placed on its belly with its legs folded beneath its body and was a very old male, perhaps aged around 19–20 years. The high fragmentation of its head, and the impossibility of reconstructing it, render it impossible to determine the location and shape of the killing blow.

Horse C was placed in front of A and was also placed along the wall of the burial chamber. Its head pointed downwards and there is a break in continuity between the occipital and the first cervical vertebra, revealing a forward tilting of the cranial block at the time of decomposition. The forelegs were in right ventro-lateral position. It was a male aged about 4.5 years old. A perforation 15.2 mm acrossis observed on the right temporal, near the temporal line.

Horse B appears to have been placed next, the limbs wedged against the sides of horse A. The animal lies on its left side, the forelegs and hind legs flexed and its head resting against the north wall of the pit. It is a very old male (around 19 years old). A large cavity from at least two blows to the right and left parietals indicates the manner of slaughter. The shape of the depression does not allow the exact number of impacts to be defined but we may consider three or four blows.

The remaining horse (D) was apparently placed last but the contacts between the bones do not allow certainty and it could either have been placed at the same time as the previous one or immediately before. On the other hand, it was well placed at the head of the convoy, on its belly, its hindquarters folded under its abdomen and the left front slightly unfolded outside. The head looks down, the nose appears to be planted on the ground. The rupture at the junction of the atlas and occipital indicates that decomposition occurred in an unclogged environment. It is a very old male, older than individuals A and B. A depression of 15.4 mm on the right temporal illustrates its slaughter.

Syrgal 3: tomb 1

Tomb 1 of Syrgal 3 contained four horses placed north of the burial chamber with the head of each placed towards the west. The excavation conditions did not allow stratigraphic recording of the sequence of deposition but the photographic records make it possible to determine that the first horse to have been deposited is horse 4, i.e. the one which closes the funeral convoy. It was placed against the wall of the room, its abdomen covering part of the forehead of horse 4, then horse 2. Horse 1 has its hindquarters resting on the head of horse 2. He was placed third. It appears that horse 3 was placed last, but the information for this last animal is incomplete. The bones are well preserved and the humidity of the substrate allowed a good conservation of organic materials but, combined with the weight of sediments, heavily deformed the skulls.

Horse 4 was placed against the north wall of the chamber. He was placed on his left flank with his head pointing down. It is an animal whose coxal is female but whose mandibles and jaws carry well-developed canines, so is probably a castrated male. Its age is advanced but the enamel of the teeth is completely ruptured, preventing a definite evaluation. The state of the skull does not permit recognition of any trace of slaughter.

Horse 2 is an adult of about 18 years. The coxal is very clearly of female type, but the dental series comprise very well-developed canines. It was placed on its right flank; the hind legs unfolded and the front legs rather bent. A square depression of 12 mm can be seen on the left temporal fossa. Horse 1 is a juvenile male of 3 years posed on the belly with the front quarter slightly twisted and posed on the right side. Death was caused by a blow to the left temporal boundary and the outer sagittal crest. A bone fragment is present, still connected to the edge of the wound; the shape of

the latter is a square of 15mm sides. Finally, horse 3 is a male of about 12–13 years, wedged in front of horse 4, against the wall. It is placed on its belly, the head making an angle with the neck and protruding partly on the west side of the grave; it is a very massive animal. Several blows are visible on the frontal: one, on the left, is of a square shape with 14 mm sides; the others, more central, created, in their multitude, a broad cavity of 4 x 2 cm.

Khatuu 1: tomb 1

The tomb consists of a coffin next to which a horse was placed. It was oriented with its head to the northeast and was placed on its belly with its limbs folded beneath. This was a very old adult. Three marks were found on the skull (Figure 8). One was a square hole 7.8 mm across, located on the right frontal; a second square hole, 8 mm across, was located on the occipital (right part), and an elongated hole 25.5 mm long was found on the left temporal. Either the animal was not knocked out the first time, or perhaps two or three individuals took part in the slaughter. In any case, it is clear that different elements of the axe-pick were used: in one case it was the flat part but for the other two it was the point.

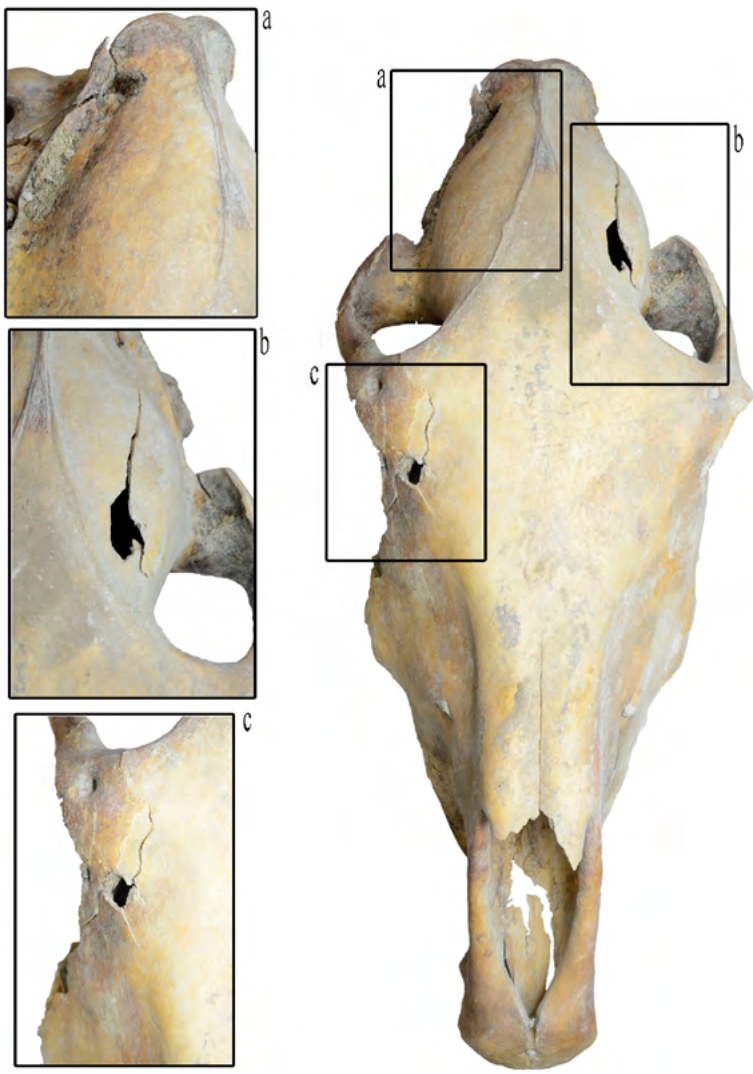


Figure 8. Perforations on the skull of the horse of tomb 3 at Khatuu 1

Khatuu 1: tomb 2

This double burial is oriented along a northeast/southwest axis. It includes a coffin along which a horse (at the northwest) has been placed. The animal sits on its right side with its head to the northeast, so that its back is pressed against the coffin. The left foreleg is extended, the right bent under the abdomen. The left posterior part, on the other hand, has undergone a major displacement which has scattered the bones and is probably not of human origin, hence the femur has been dislodged from the pelvis and moved to the front of the animal, and the tibia placed on the thorax. The presence at its distal end of the slope and the proximity of the metatarsus, in alignment, testify to the date of disturbance. The calcaneus is isolated, revealing a scattering process which had occurred gradually. It is hard to imagine that these movements took place in a crammed environment and the upheavals must have occurred while an empty space still existed around the dead horse. The cause is uncertain but may have been caused by a burrowing animal, such as a fox, although there are no taphonomic traces, such as tooth marks, to prove this. The horse is a very old male (19–20 years). A strike with an axe was made at the left temporal line, at the frontal and temporal limits. A unique 11.2 mm square recess attests to this.

Khatuu 2: tomb 1

The horse in this tomb had its head to the northeast and its hindquarters to the southwest. It was placed north of the burial chamber on its belly, with its legs bent below it. Its head pointed down and the accumulation of soil under the neck and the perfect connection of the neck and head seems to indicate decomposition in a packed environment. It is a very old animal (19–20 years) and its sex determination was a problem. The shape of the pubis, flattened and angular, would correspond to a female, but the

Figure 9. Perforations on the skull of the horse of tomb 6 at Khatuu 6

presence of well-developed canines (especially the lower canines) make it possible for it to be male. The particular conformation of the coxal could therefore be due to early castration. The trace of the slaughter is characterised by a circular depression 29.4 mm across on the right temporal, under the temporal crest.

Khatuu 3: tomb 6

This tomb contained three horses. They were located north of the burial chamber with their heads facing east. The disposition of the animals could not be estimated in the field. It appears that horse 3 was covered by the other two. The disposition of its neck is marked by a pronounced angle which makes its head rest on its left side. Horse 2 seems to have been placed second, on its belly, its limbs generally folded below it and its head pointing down. Horse 1 covers horse 3 and appears to be set against horse 2. Its bones were removed during excavation but their disposition can be established from photographs: the main information is that its left front was folded under its thorax, but the right front was extended with the front hoof located under its head. This arrangement stems from the placement of the latter animal in a restricted space.

Horse 1 was a very old male with no bone pathology. The skull has slaughter stigmata. One is a bilobed cavity on the right side of the temporal: the impact diameter is 11.6 mm. A particular flaking is observed on the edges of the second part of the cavity. This reveals a lever extraction of the weapon, once the blow was made; this gesture enlarged the wound by blowing up elements of bone on the edge. The other trace is that of a square depression of 14 mm on the right part of the temporal. Horse 2 was a very old male aged 19–20 years or possibly even older, without visible bone pathology. At least two blows were made to the left side of his forehead using the sharp, elongated side of the axe (Figure 9). The recesses are 33 mm and 36 mm long. Horse 3 was also very old (but a little less than 1 and 2), and placed on its stomach. There are two marks of the same size (14.5 mm) located side by side on the right side of the temporal. These two successive strokes created a cavity larger than the sum of the diameter of the two initial impacts alone.

A varied number of horses in the graves

Of the 40 kurgans identified for this work, the majority (24) only contain a single horse (Figure 10). In this case, the animal may have belonged to the deceased. In the other 40% of cases, there are several animals, the number varying from 2 to 13. The largest numbers (8, 10 and 13 horses) are only encountered once and are all located in Berel' (tombs 8, 10, 11). Elsewhere, the number is more modest. For some (BTG 6, tomb 11), there is a double pair: two adult men and two horses, thus it is possible that these individuals are the owners of the animals. However, it is not possible to address the question as to whether they were interred at the same time or subsequently. In other cases, the grave is that of two individuals but with only one horse. This is the case for example at BTG 6 Grave 10, where a woman and a 6–7 year child were placed side by side. One can note here the association of a woman and a horse, suggesting that the deposit of horses was not reserved for men, unless the animal is to be associated with the child (who is of unknown gender). The pattern is similar to TSK Grave 2 where an adult male and a child of 8–9 years were associated in the grave and accompanied by a single

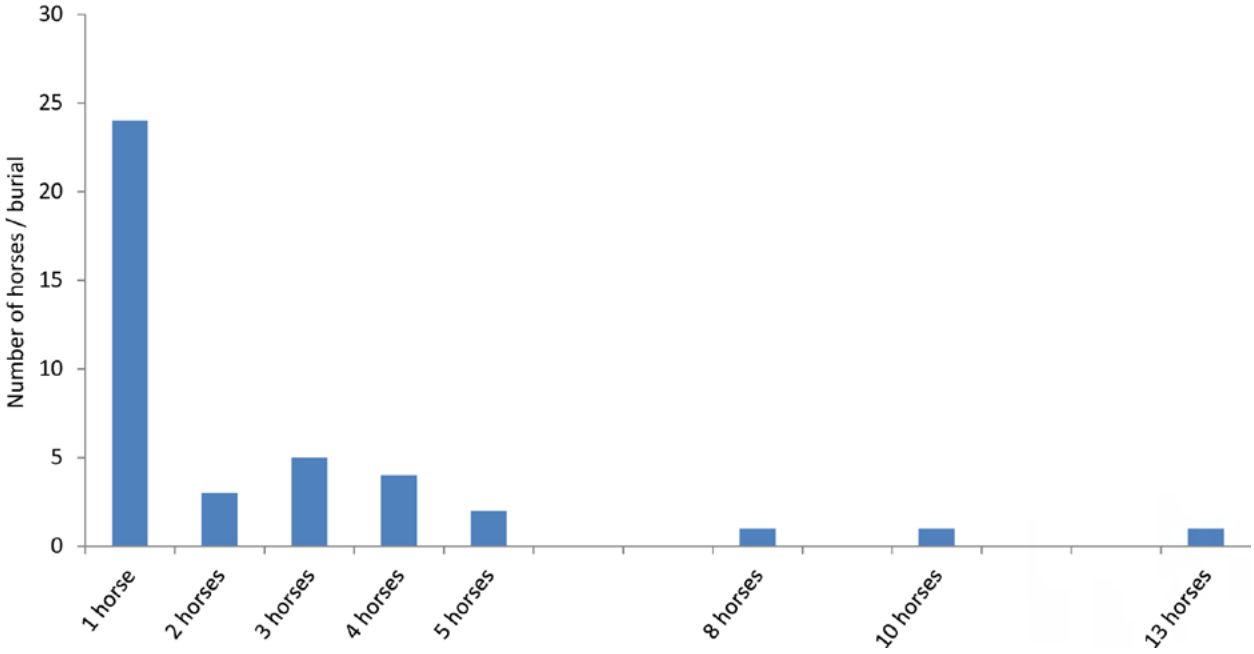


Figure 10. The number of horses in the graves

horse. The other cases of plural deposits are: Syrgal 1 tomb 1, where two individuals were found with five horses, and Syrgal 2 tomb 1, where the four horses were associated with only one individual. It is tempting to think that the quantity of horses is linked to the social status or wealth of the deceased, especially in the case of princely tombs like Berel', even if one does not know if the number itself has a meaning, or if there was a rule concerning the age or gender of the buried.

Positions and arrangement of horses

The arrangement of the animals meets fairly precise rules. Horses were systematically positioned north (or northwest) of the grave whereas humans are placed in the southern part. The horses' heads, like those of the human remains, are overwhelmingly placed to the east or in some cases to the northeast. This is a constant for tombs of this period.[12] At Pazyryk, the animals were mainly oriented eastwards but the practice at this site was to adapt to the space available in the pit.[13] Thus, several variants are present: two animals had their heads facing south in tomb 1, one in tomb 2, four in tomb 3, whereas two other horses were turned west. Tomb 4, on the other hand, was organised in a singular way with 14 animals positioned in a variable way. At Berel', the 13 horses are arranged at the north of the tomb and also all faced east. However, this rule is broken in four Mongolian tombs: at Baga Türger 1 (tombs 1, 2, 8) and at Syrgal 3 tomb 1, horses and humans are arranged so that their heads are west of the pit.

One could propose a connection between the arrangement of the tombs with choices linked to the movement of the constellations: the east/west axis of the bodies is located, for example, on the orbit of the sun, moon and stars. Consequently, the north/south separation (horse/human) is established with respect to this axis. One might then speculate on the meaning of this organisation but it is difficult to distinguish between rules with ritual meaning, recognised and envisaged as such by the officiants, and cultural customs. The fact that the rules were not always respected makes it possible to consider different meanings.

Selection by gender

At the site of Berel', as well as in Mongolia, all of the dental series of adult horses present well-developed canines, thus 101 horses are males. This phenomenon is characteristic of Scythian tombs and is also the case at Arzhan-2[14] and Pazyryk.[15] Cases where horses are females are extremely rare, such as at the site of Kizil in the Siberian Altai, north of the Belucha massif, where the excavations carried out by I. Bourgeois *et al.* revealed an exceptional case of a mare, the remains of which were studied in detail by A. Ervynck.[16]

We would like to know to what extent these animals were entire males or geldings. We have to admit that osteology is rather unhelpful here. At Pazyryk, where only males were present, the exceptionally good preservation of the animals allowed Rudenko to affirm

[12] See also the cases described in Levine *et al.* 1999: 47 and Ervynck 1995.
[13] Rudenko 1970.
[14] Bourova 2004.
[15] Rudenko 1970: 118.
[16] Bourgeois *et al.* 2000: 89; Ervynck 1995.

Figure 11. Detail of the Pazyryk carpet: the gender of the horses is clearly indicated

that all the animals had been castrated;[17] Vitt went on to suggest that the largest horses there were young castrated geldings.[18] We know from Strabo that the Scythians and Sarmatians castrated their horses so that they would be more docile: 'It is a peculiarity of the whole Scythian and Sarmatian race that they castrate their horses to make them easy to manage; for although the horses are small, they are exceedingly quick and hard to manage.'[19] A similar remark was made by Ammianus, the later Roman military historian, in his description of the Sarmatians:

> 'These people, better fitted for brigandage than for open warfare, have very long spears and cuirasses made from smooth and polished pieces of horn, fastened like scales to linen shirts; most of their horses are made serviceable by gelding, in order that they may not at first sight of mares become excited and run away, or when in ambush become unruly and betray their riders by loud neighing. And they run over great distances, pursuing others or themselves turning their backs, being mounted on swift and obedient horses and leading one, or sometimes even two, to the end that an exchange may keep up the strength of their mounts and that their freshness may be renewed by alternate periods of rest'.[20]

There are some indications that some of the animals studied here had been castrated. Indeed, the pubis of certain hip bones (TSK1–2, TSK1–3B, and especially at Syrgal 3, tomb 1 and Khatuu 2, tomb 1) are particularly thin and the dorsal pubic tuber particularly not marked, thus very probably reflect geldings. The first horse is a fairly large animal, which might support Vitt's hypothesis, but the others are not particularly so, which does not allow us to conclude that there is a proven link between the size of the animals on the sites studied and the practice of castration. However, it remains to be seen whether the other horses are entire or not. The difficulty of this research lies in the extent of the physical transformations which depends on the age of operation as the morphological modifications is less marked within the framework of a late sterilisation. At Arzhan-2, it seems that at least six of the 14 males were castrated.

There is thus undeniably a common character to all the tombs of this period: the sacrificed horses are males. One must then question the reasons for this specificity: are these choices related to funeral practices or the consequence of the configuration of the herd which favours males as ridden animals and which will leave the females in the herd to produce milk and foals? Unquestionably, the major proportion of the horses deposited in the tombs were ridden since most carry bits and elements of harness, but that does not settle the question of selection and one could conjecture that ridden females were not chosen for sacrifice.

In fact, not knowing herd structures, breeding and riding practices, other than through graves, creates biases in our perception of choice. Scythian figural representations are of little help to us since they rarely

[17] Rudenko 1970: 118.
[18] Vitt 1952.
[19] Strabo, *Geography* 7.4.8.
[20] Ammianus, *History* 17.12.3.

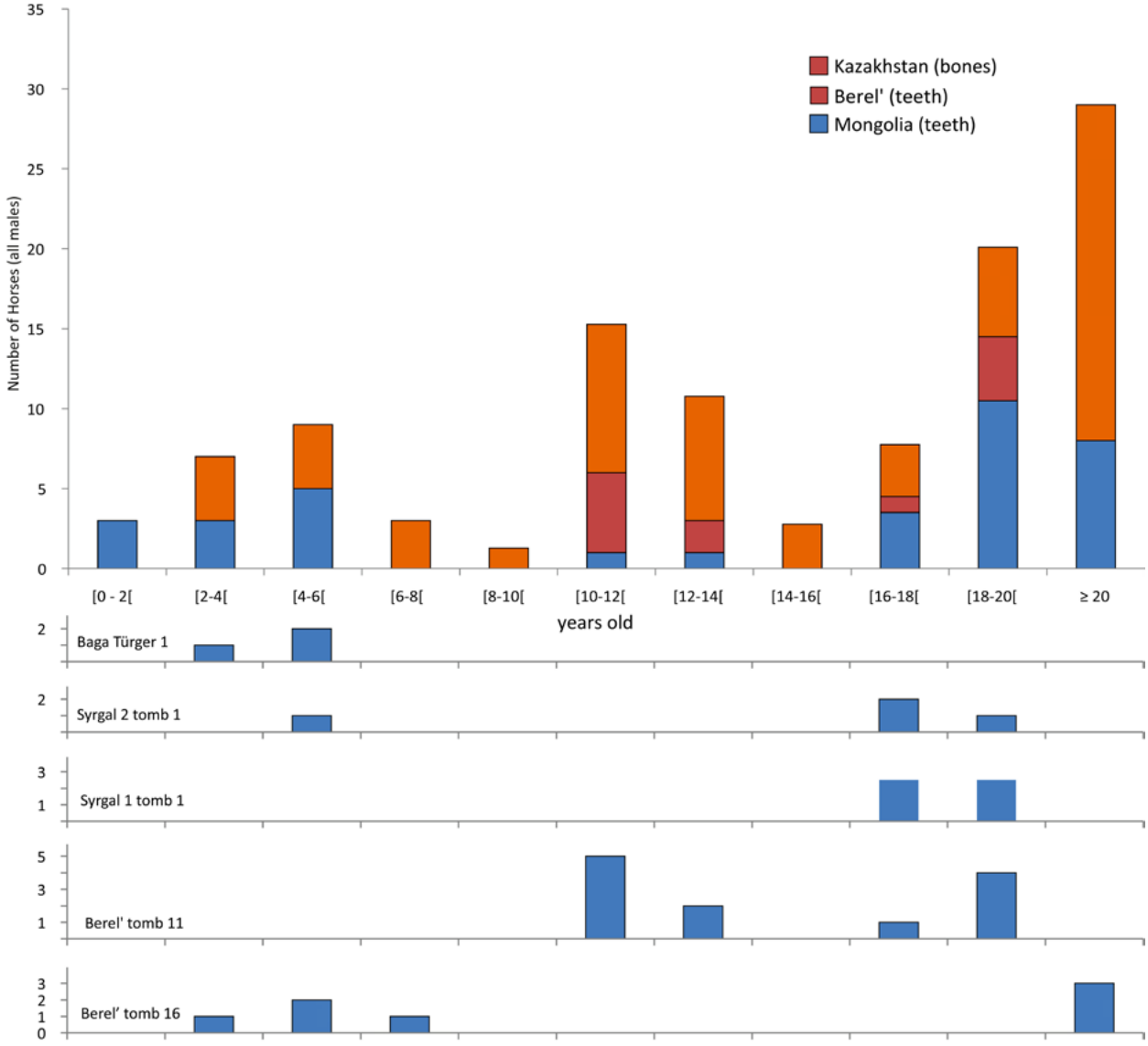


Figure 12. Age of horses in graves

represent the sexual attributes of horses, and a count from these is therefore irrelevant. It is true that the images coming from Achaemenid Persia are quite different: the horses represented on the Persepolis monuments are males, be they royal horses or those of tributary peoples (including the XI-Saka delegation). Another very characteristic example is the Pazyryk carpet, made in Bactria or one of the eastern satrapies, on which the horses are represented with all their characteristics, allowing positive recognition of males (Figure 11). This is probably not an unimportant detail, inasmuch as the gender of the animals is represented as precisely as the knots of the tail, the ribboned mane, toupee on the head, bells, fringed saddle and clothing of the grooms, all indications of Persians.

Age of the horses; age selection

Describing buried animals involves estimating their age. As the methods used vary according to different researchers it is necessary to distinguish information derived from dental data (Berel' 11 and the Mongolian sites) from that derived from analyses of the bones.

For the Mongolian sites, the age range is rather wide, as one not only finds very old animals in the tombs but also juveniles of less than 2 years (Figure 12). Adults were the most common and those aged over 16 years represent two thirds of the animals but it is interesting to note that at Baga Türger some human beings were buried with animals aged only 1 year. At Berel' 11, the animals were not all of the same age: a good 10 years separated the youngest horse (horse A), which was around 8 years old, from the older horses (horses E and M) which were over 19 years old. There was therefore no strict selection of ages: there are adults of an advanced age since one group is made up of six animals around 10–14 years old and another of five old horses aged over 16 years. At Berel' 16 (an estimate based on bones), the situation is different since both young and

old are present, while the intermediate class of 10–14 year olds is absent.

There is therefore no rule in age association when several horses are present in the same grave. In tomb 1 of Syrgal 2, one horse was young whereas the other three were rather old; in tomb 1 of Syrgal 1, the five horses were old, whereas at Baga Turger 1 all three were young. The analysis thus reflects an absence of strict selection, even if adults were in the majority and, among them, the elderly were in good position. This situation is confirmed at other Altai sites.

At Kizil, the mare was 11 years old;[21] horses from Ak-Alakha 5 were 7–10 years old, 10–15 years old and over 18 years old,[22] and at Arzhan-2 the ages were also between 8 and 20 years.[23] This does not correspond with the idea sometimes advanced that animals were chosen from among the oldest, those which become unfit for riding, developed diseases or had the least value.[24] The selection criteria must therefore depend on various conditions, doubtless linked to the availability of the animals and the choices of their owner.

The size of the animals, the shape and coat: elements of description

The size of the horses found in the burial mounds has received a good deal of attention in the literature and the aim of many authors was to try to characterise herds and define forms or breeds mentioned in texts or represented on sculptures and other media.[25] One could consider that osteometric analysis also made it possible to define the level of homogeneity of a set of horses, thus addressing questions related to the single or multiple origin of the animals sacrificed at the time of the funeral. In terms of rituals, it can also be a question of whether, in a grave, the largest animals are those to whom the most attention had been paid, through their harness for example, and it is a search which can also be applied to other selection criteria such as age.

The horses of the Mongolian tombs have an average height at the withers of 1.35 m. This is roughly the same as that found in other horses of this period and this region.[26] However, there are small differences between individuals. The tallest animal comes from Syrgal 2, tomb 5 (horse A: 1.46 m), while the smallest of the adults comes from Khatuu 2, tomb 1 (1.29 m). Excluding those juveniles which have not reached their adult size (1.24 m for BTG6,13 and 1.26 m for TSK1,3A), there is almost 12% difference between the smallest and largest animals. Located within their Altai context, we note that the animals of BTG6 and TSK1 are perfectly within the average range of contemporary horses judging by measurements of about 90 horses collected by Derevyanko and Molodin.[27] However, at Berel' the animals were larger (1.38 m on average), i.e. in the upper part of the recorded range.[28] At Arzhan-1, the animals were quite small, do not exceed 1.38 m (for an average of 1.36 m) and some animals were less than 1.20 m high at the withers.[29] At Arzhan-2, on the other hand, they were quite tall as the vast majority (86%) was between 1.36 m and 1.44 m high, with some even reaching 1.52 m (the average is 1.41 m). Finally, at Pazyryk, the situation is different again as the range of heights is rather wide, more so than either Berel' or Arzhan-2, but notably consisting of the tallest animals in our corpus (more than 1.56 m).[30]

Ultimately, it is difficult to compare horse size from the withers height as size estimates are obtained by using coefficients which have been calculated on horses of different types and morphologies from those of the Altai. However, depending on their origin, some will have shorter or longer leg bottoms and more or less developed thighs. It is therefore more prudent to work from the length of each bone.[31] This more objective approach shows that the difference between the bones of the tallest and smallest individuals is between 14% and 22%. As early as 1952, Vitt had used a metapodial length index (length of the metatarsus relative to the length of the femur) to estimate the ratio between the length of the thigh and that of the cannon bone. Applied to our skeletons, the method highlights the presence of animals whose lower legs are slightly longer than others but without significant differences. One must be careful not to over-interpret such data, particularly when using paleoenvironmental data, as was done in the study of the horses from Arzhan-1 and Arzhan-2.[32] The author believed that the reduction in the size of the metapodials between the 9th and 7th centuries BC was an indicator of climate change which was linked to the establishment of a humid climatic phase, as attested by palynological and radiocarbon studies.[33] Since it is difficult to imagine such a rapid modification of equid

[21] Ervynck 1995.
[22] Levine *et al.* 1999.
[23] Benecke, Pruvost and Weber 2010.
[24] Bökönyi 1968.
[25] E.g., Vitt 1952.
[26] Multiplicative coefficients were applied to bone lengths; reference coefficients are from von May 1985.
[27] Derevyanko and Molodin 2000.
[28] Francfort and Lepetz 2010.
[29] The averages for Arzhan-1 and Arzhan-2 were calculated using data from Bourova (2004) and applying our coefficients, but without integrating the values provided by the femurs (which are not exploitable). The data provided by Benecke and Weber (2007) are different: Arzhan-2 from 1.35 to 1.47 (mean: 1.40); Arzhan-1 from 1.29 to 1.42 (mean: 1.35) but without knowing the coefficients these authors used.
[30] Vitt 1952.
[31] Francfort and Lepetz 2010.
[32] Bourova 2004; see also Zaitseva *et al.* 2005.
[33] Van Geel *et al.* 2004.

morphologies, one must consider other possibilities: the largest horses are met in some tombs, those which seem the most prestigious (Pazyryk, Berel'). It would then be tempting to consider that there is a link between the status of the tombs (royal, princely, more modest) and the size of the horses buried there. The other possibility would be of a cultural nature and would stem from the herds and peoples who buried them but there is still a lack of precise data which would make it possible to categorise the phenomenon.

Until recently, it was impossible to describe the coats of the horses, except where the hair was preserved, even though the conditions for excavation and collection of samples were often not always met for this type of analysis. However, recent work in genomics applied to ancient DNA completely changes this field of knowledge. Work conducted at Berel' revealed that six horses have chestnut coats, four are bay, one is bay/cream, one is black and one is spotted (Figure 13).[34] The first conclusion highlights the diversity of hair colour at that time. The other finding is the absence of exclusive choice regarding the colour of the coat when animals are sacrificed. It also appeared from these analyses that the animals were not related, except for horses K and L (which were placed side by side in the tomb). It is therefore very likely that at least all the other horses came from different herds, confirming the conclusions of the analysis of ornaments and harness elements and echoing Herodotus' description of sacrificial practices involving horses donated by allied tribes at the funerals of important members of the community.[35]

Animals in pretty good condition

At Berel', the paleo-parasitological study revealed that although the horses had indeed been hosts to pathogens, namely Oxyuris equi and a nematode belonging to the order Strogylidae, parasites were common but not responsible for serious disabilitating infections.[36] One horse had a slight back problem but this could not have disabled it. However, at many other sites, horses present pathological anomalies (osteophyte, ankylosing or deforming spondylitis, bone proliferations) which mainly affected the vertebrae and the BTG6 and TSK1 animals were also severely affected by these problems. Indeed, if we exclude the two younger animals (TSK1,3A and BTG6, 13), all animals were affected in this manner (Figures 14–15).

The back is certainly one of the most complex parts of the musculoskeletal system in horses and is also that most commonly affected by riding, use as a pack animal or in traction. As regards the first, depending on the intensity of use, the nature of the saddle will have had a determining role but it should be borne in mind that these pathological diseases can also have a genetic origin, thus these deformities can be ankylosing spondylitis which weld the thoracic vertebrae together (three horses), the lumbar vertebrae (one horse), or which join the lumbar vertebrae to the sacrum (four cases), with some animals presenting all these pathologies. Often these attacks are combined with others, notably those manifested by bone proliferation on the joint apophysis: the last thoracic and the first lumbar vertebrae are then affected (six cases). Horizontal fissures across the caudal vertebral body of two thoracics may also be present (one in two thoracic cases). This type of pathology has been observed on several excavated horses of different origins. Some hypotheses have been put forward to explain this type of fracture: repeated jumps made by a horse carrying an unsuitable saddle, or a horse ridden too hard or for too long.[37]

The horses from TSK1 and BTG6 had clearly been used intensively but one should probably not conclude too quickly that they had become unfit for riding and that was the reason why they were selected for the tomb as the presence of young and quite healthy horses supports an alternative hypothesis. Moreover, the ritual slaughter of an old horse can be an important mark of respect insofar as the latter may have belonged to the deceased. In the case of prestigious graves, where horses were numerous, they may have been donations made by other tribes or come from a group of animals used in processions during their lifetime. Thus the old age of a particular beast may reveal its high symbolic value, as well as a low price. It is interesting to note that the Berel' horses are much less affected by this kind of pathology than those of other sites. Indeed, only one animal at that site had a reduced pathological disease on two lumbar vertebrae. This is strange, especially since the animals were also old horses, and perhaps this phenomenon was linked to a particular type or use of saddle at Berel'. Levine has drawn attention to the link existing between these pathologies and the use of padded saddles which are in contact with the dorsal vertebrae,[38] whereas reinforced saddles do not rest on the spiny processes of these vertebrae. The riding conditions of the animals at Berel' may explain the low frequency of bone pathologies.

A sacrifice which leaves its mark

The horses were struck by a weapon of the same type and they received one or more blows to the head. Where the skulls are sufficiently well preserved,

[34] Librado *et al.* 2017.
[35] Herodotus, *The Histories* 4.72, quoted in full by Chugunov, this volume.
[36] Le Bailly *et al.* 2008.
[37] Müller 1985; Benecke 1994.
[38] Levine *et al.* 1999: 51–52; 2000: 130–31; Derevyanko and Molodin 2000: 243–49.

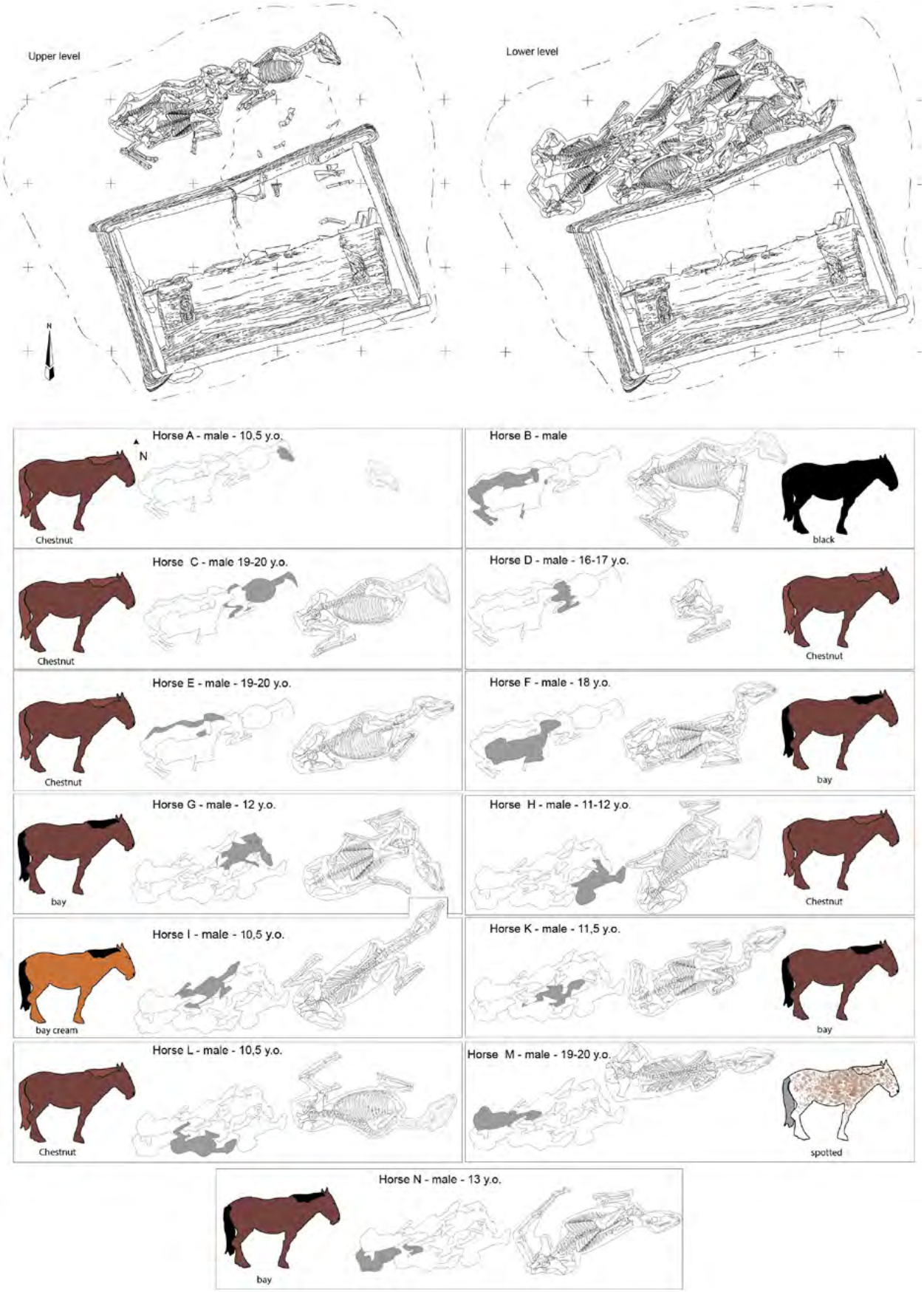


Figure 13. Position, age, sex and colour of the coat of the horses in Berel' 11

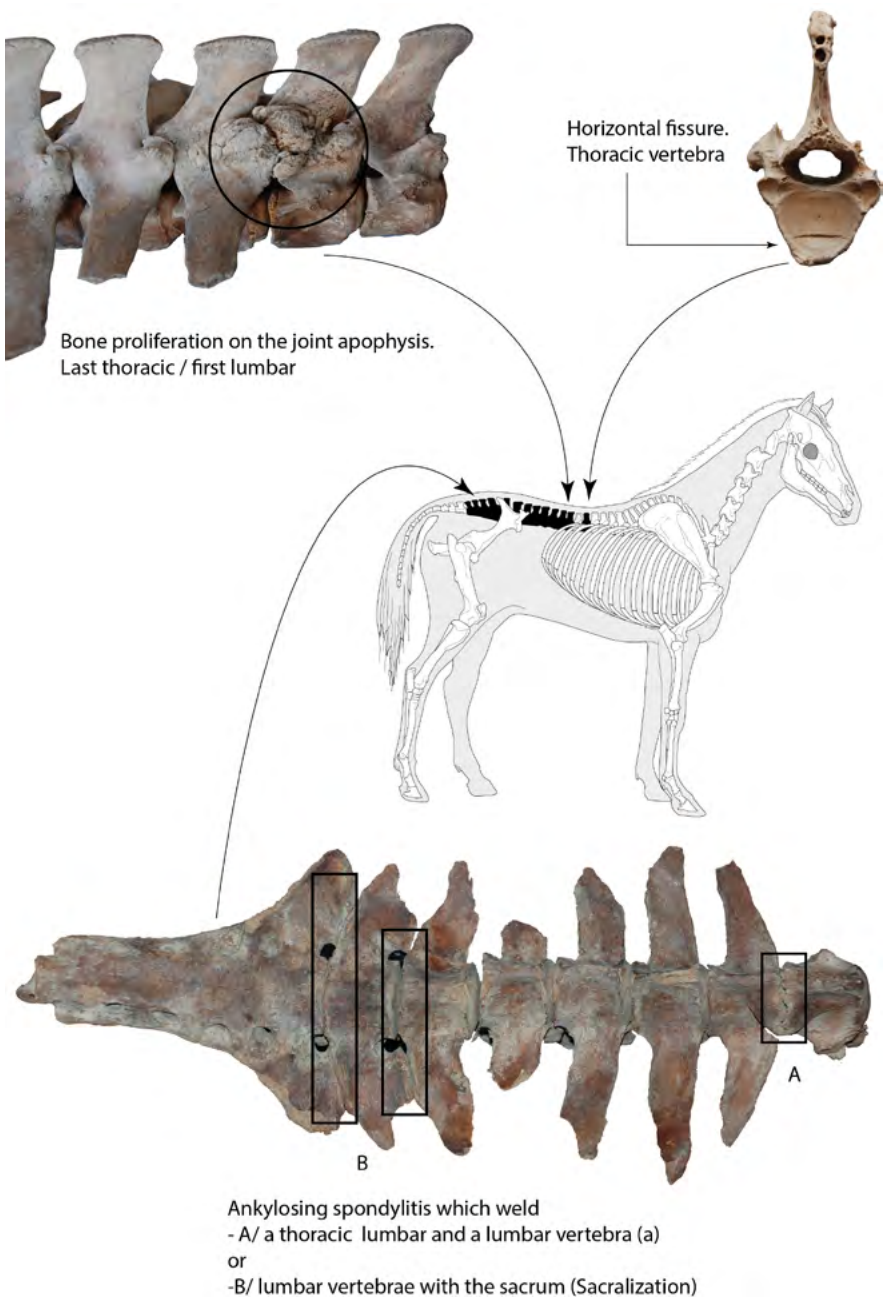


Figure 14. Bone pathology impacting the backs of horses

Site	Tomb	Horse	Spondylosis on vertebral bodies	Fusion of vertebral bodies	Bone proliferation on articular process (even fusion)	Fissure on vertebral epiphysis	Bone bridge or bone proliferation on spinous process	Other spinal pathologies	Other pathologies
Baga Turgen Gol 6	10			L5-L6	TH15-18 & L1-4			1st C	
Baga Turgen Gol 6	11	A	TH12-15	L5-L6	TH16-18				metacarpal injuries; patellofemoral arthritis (knee)
		B	TH13-14	L5-L6	TH16-18				
Baga Turgen Gol 6	12		TH18-L1 (L2)						
Tsengel Khairkhan 1	1			L5-L6	TH18-L1				
Tsengel Khairkhan 1	2				a little on TH			1st C	
Tsengel Khairkhan 1	3	B	L4-6		TH15-18 et L1-3	2 TH			
Syrgal 1	2		TH18-L1		TH				
Syrgal 2	1	A	TH18-L1		a little on TH				
		C					TH4 to TH10		proximal left tibia (knee); Bulge of nasal bones
		D		L5-L6			Th 13 to TH17		
Syrgal 3	1	3			L3-L4 (fusion)				
		4		L5-L6					proximal tibia (knee)
Khatuu 1	1			L5-L6					
Khatuu 1	2							1st C	
Khatuu 2	1			TH19-L1	TH16-18		TH14-TH15		dominant left premolar 2

C = cervical vertebrae; TH = thoracic vertebrae; L = lumbar vertebrae

Figure 15. Counting bone pathologies of Mongolian grave horses

it is possible to detect traces of rounded, square or elongated perforations on the frontal bone or temporals. These impacts are common on horses (as well as human individuals) buried in graves of this period. At Pazyryk, Rudenko reported that the horses had been killed by a blow to the top of the forehead which fractured and punctured the bone.[39] The holes have a diameter of 7–20 mm or a length of 23–36 mm. The weapon used is well known: it is an axe-pick with a pointed end and a flattened or rounded butt,[40] and is sometimes found *in situ* in graves at the hip level of the deceased individual, thus was worn at the waist as represented on contemporary Scythian and Achaemenid sculptures.[41] Nine horses were killed by a single blow (Figures 16–17), 11 others were struck twice; two definitely received three (BTG6,12) and one probably also received three (TSK1,1). In the majority of cases, the blow was carried by the rounded butt of the axe whereas in three instances the point of the weapon was used (BTG,11B and TSK1,1, Khatuu 6,2): the weapon struck the horse's forehead more or less perpendicularly, indicating that the person dealing it had their arms at the head of the beast and that both must have been standing. Generally, it is the back of the head which was affected and at the level of the temporal bones; sometimes the blow concerned the right temporal, in other cases it affected the left temporal, whereas in others the blow was centred. In three cases – in each time these are blows with the edge of the axe – the frontal was hit. This contrasts strongly with the cases recorded at Berel'. At this site the frontal was much more affected than the temporals, coinciding with the wearing by these horses of false horns or an ornament fixed at the top of the head, slightly backwards, which led to the blow being carried on a more anterior zone of the skull. It is likely that the ritual slaughter took place very shortly before the deposit in the grave. Since rigor mortis occurs quickly after the death of an animal or after a few hours at most, this would have prevented the animals from being placed on their stomachs with their legs flexed beneath them. It remains to be seen whether the sacrifice could have been made in the pit itself but this seems unlikely given their limited size and the difficulty of managing the reactions and stress of the horses under such conditions. In any case, to put down a horse dressed in ibex costume, as at Berel', was undoubtedly an act of great significance. This gesture echoes certain animal representations of the petroglyphs of central Asia where horned horses have sometimes been depicted with, in front of them, a character appearing to axe them and very good examples can be seen in Tamgaldy in Kazakhstan.[42]

[39] Rudenko 1970: 40; Vitt 1952.

[40] E.g., Simpson and Pankova eds 2017: 218, cat. 134 (State Hermitage Museum, inv. nr. 2917/19/1–3).

[41] E.g., Chugunov, Ryabkova and Simpson 2017: 198–200, figs 126–30.

[42] Francfort *et al*. 1995: fig. 9.

Conclusion

The age of the animals and the high frequency of bone pathologies in horses from Scythian tombs have sometimes been arguments advanced by some authors to explain their slaughter.[43] The idea was that the horses had been selected because they had become unfit for riding. However, if the animals are certainly old, only a few, the oldest, are carriers of bone pathologies and the paleo-parasitological study does not reveal serious diseases. The health of the horses is therefore not the cause of the sacrifice; moreover, the old are not the only ones to have been slaughtered as sometimes young animals, even very young ones, are also present. One can imagine that the horse and the human buried alongside had a link and the sacrifice of a rider's long-time companion would have been of high symbolic value. To slaughter such a mount is an important, serious and probably painful, gesture and which probably does not have as its origin a hypothetical will to find, in a practical way, an honourable outlet for a horse at the end of their life.

In the case where several horses are deposited, the genetic data indicate that, at least for Berel' Grave 11, they were animals bred in separate herds and that they were not only mounts belonging to the deceased but probably donations. There remain the intermediate cases of a human associated with three or four horses which could be the property of the deceased or of family members and future genetic analysis may answer this.

The care taken with the harnessing of the horses indicates that they had a primordial role and important value within the funeral ritual and in the eyes of the living. While the predominance of males probably reflects their frequency among mounted animals, the abundance of older animals should be related to their status. These animals were related to the Saka cosmology. They could be sacred animals, accompanying the deceased in the afterlife, constituting a support of beliefs or a vector of prayers destined for divinities, among many elements that death separates from experience. Horses were undoubtedly also a means for the living to pay homage to the dead. The reason for their presence is therefore polysemic and the complexity of these multiple meanings should be acknowledged.

However, this research can only be conceived within the framework of a precise archaeological approach which seeks to define the initial position of the corpses, the order of their deposition, understanding the movement of the bones, and the history of the body before its deposit and after, once it has been transformed into a skeleton. This is standard procedure for human

[43] Bökönyi 1968.

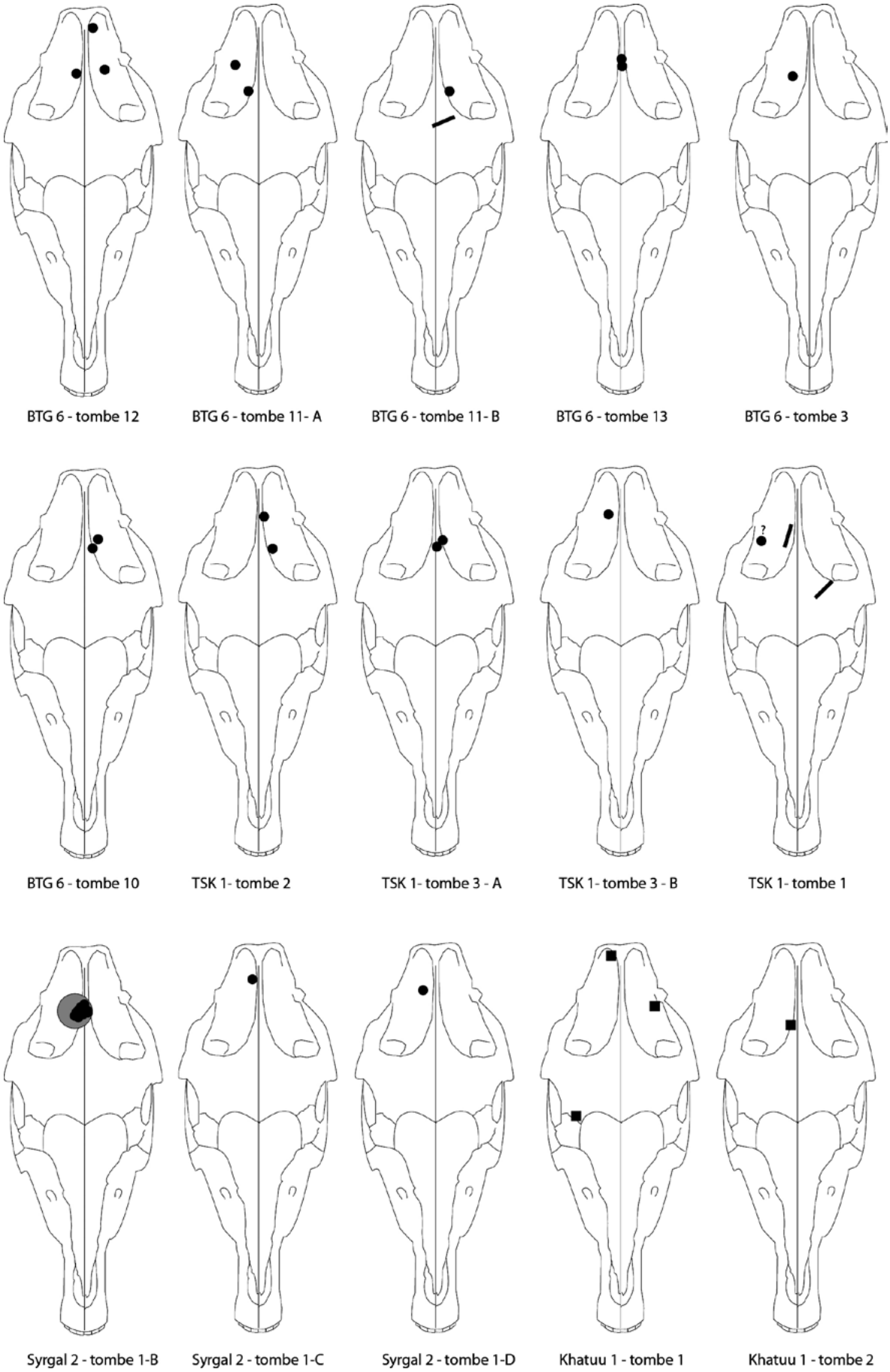
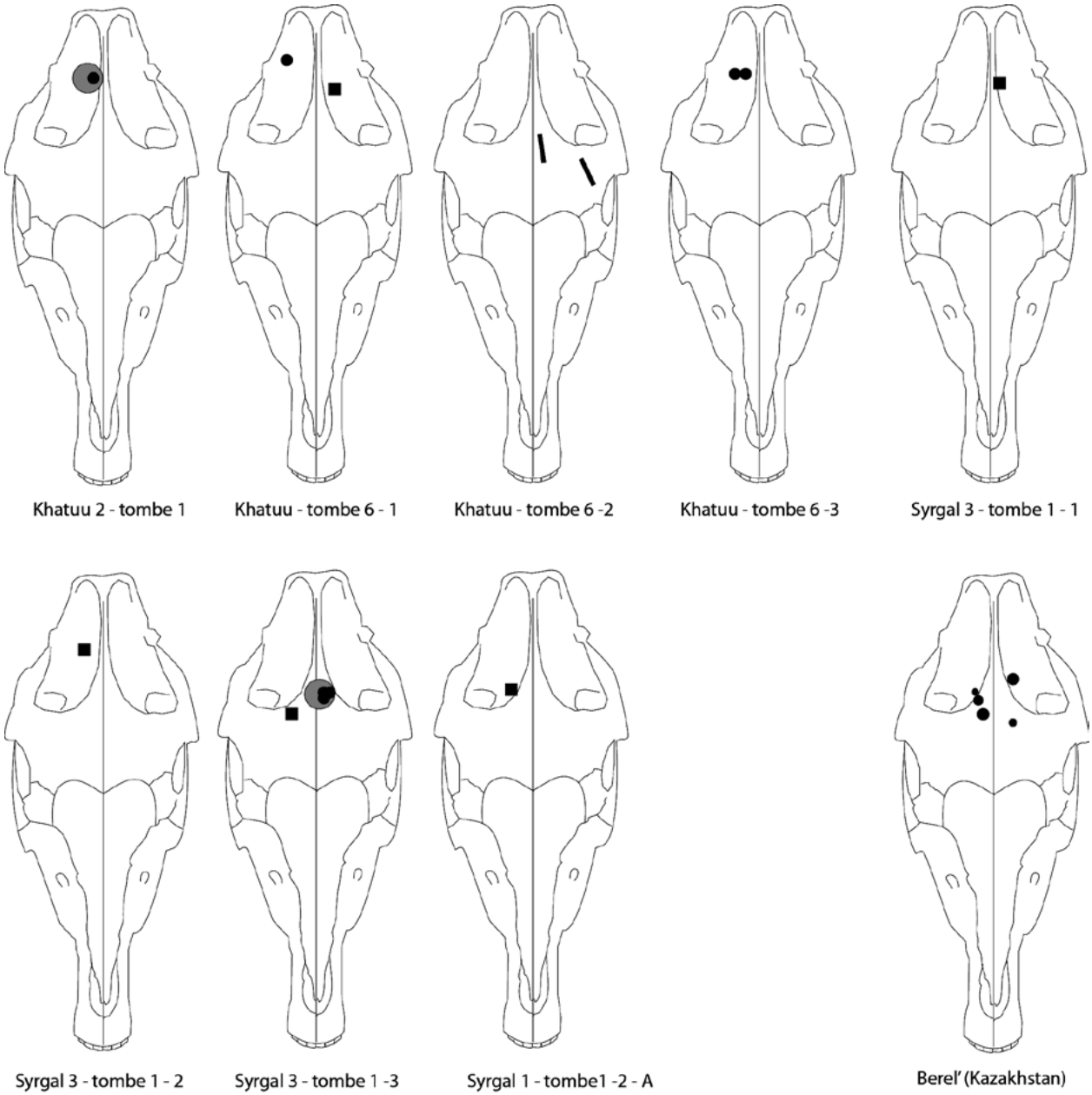

BTG 6 - tombe 12
BTG 6 - tombe 11- A
BTG 6 - tombe 11- B
BTG 6 - tombe 13
BTG 6 - tombe 3
BTG 6 - tombe 10
TSK 1- tombe 2
TSK 1- tombe 3 - A
TSK 1- tombe 3 - B
TSK 1- tombe 1
Syrgal 2 - tombe 1-B
Syrgal 2 - tombe 1-C
Syrgal 2 - tombe 1-D
Khatuu 1 - tombe 1
Khatuu 1 - tombe 2

Figure 16. Position of slaughter impacts on Mongolian horses – 1


Khatuu 2 - tombe 1
Khatuu - tombe 6 - 1
Khatuu - tombe 6 -2
Khatuu - tombe 6 -3
Syrgal 3 - tombe 1 - 1
Syrgal 3 - tombe 1 - 2
Syrgal 3 - tombe 1 -3
Syrgal 1 - tombe1 -2 - A
Berel' (Kazakhstan)

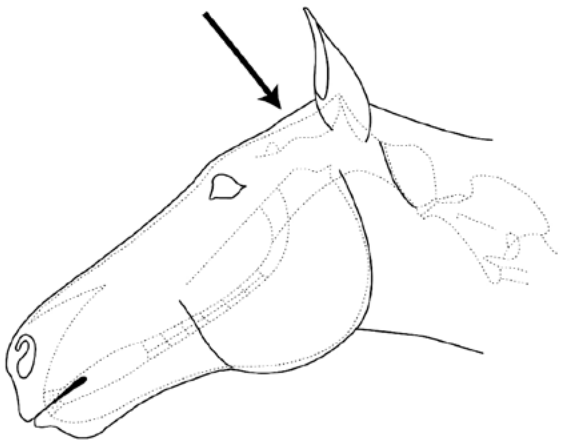


Figure 17. Position of slaughter impacts on Mongolian horses – 2

remains: the analysis must begin when the bones are excavated and removed, and not just when they arrive at a laboratory. It is only from recording in this manner that we will move beyond the stage of simple biological descriptions of the animals and refine the subject of the archaeology of ritual, including the history of the tomb from its initial excavation to its sealing, including the actions undertaken not only in the pit but also around it. Within this perspective it is necessary to consider the tomb as part of a larger assemblage, based on a common cultural and ritual base: from this we will extract information which allows a more rounded recreation of society and viewing the tomb as a whole, with its own history. Excavations must be approached with greater precision, and are likely to produce better data and more insights.

The royal *_gaunaka_: dress, identity, status and ceremony in Achaemenid Iran

Lloyd Llewellyn-Jones[1]

Abstract

The Achaemenid Persians inherited a particular form of dress which linked them to their nomadic Eurasian ancestors. Consisting of trousers, a sleeved tunic and a long-sleeved coat, this 'cavalry costume' was intimately linked to the horse-riding identity which the Achaemenids had inherited from the steppe peoples of 'greater Iran'. Alongside the physical garments themselves, customs, traditions and meanings were encoded in their use and in particular the sleeved-coat (*_gaunaka_) was imbued with a semi-magical quality which made it the focus of significant ceremonial.

Keywords: Achaemenid; Persia; Iran; dress; clothing; nomadic; horse; coat; sleeves; gift; ceremony

Clothing was central to ancient Persian culture, and especially so for the Achaemenid elite. For them the significance of dress could be physical, economic, social, or symbolic and the function of clothing was multiple: dress could protect, conceal, display or represent a person's office or even a state of being. Persian courtly identity was defined through its clothing, but so too was the nomadic horseman ancestry of the Iranians, although this important element is less studied.

Elite men at the Achaemenid court could be identified wearing two distinctive types of dress. The first sort, what I label the 'court robe', was a highly significant garment and may have been of pure Persian invention, although it does bear resemblance to Egyptian-style royal tunics of the New Kingdom and Late Period.[2] Margaret Root argues that the garment originated in Elam but there is nothing to support this, although it is *possible* that from the reign of Darius I a Perso-Elamite identity was somehow expressed through the garment, although I would not like to push that point too far.[3] Constructed from a huge double-square of linen or wool (or perhaps cotton or even silk), and worn over baggy trousers (largely hidden), the voluminous tunic was tightly belted at the waist to form a robe with deep folds which created an overhang resembling sleeves.[4] The court robe was richly embellished with woven designs and ornamented appliqué decorations made from gold and semi-precious stones; it was as costly as it was beautiful.[5] This was the costume of the 'Great King' *par excellence* and in Achaemenid art he is represented wearing it repeatedly, whether sitting on his throne or actively fighting in battle or killing an animal (mythical or otherwise) (Figure 1).[6] In reality the court robe was a highly impractical garment for any form of active combat, so the choice to depict the monarch wearing it with such regularity can only be explained by the fact that it was symbolically important. In my estimation, the court robe represented empire-wide Achaemenid royal authority; it was the symbol of the sedentary aspect of Persian court society which had emerged during the formative generations of empire building under Cyrus, Cambyses, and Darius.

The other form of dress found at the Achaemenid court was of a very different, far older and traditional sort. It was actually made up of five items of clothing:

- a long-sleeved coat (OP. *_gaunaka_; Elam. *kam-na-ak-ka*; Avest. *gaona*; Gk. *kandys* (?));
- a long-sleeved fitted knee-length tunic (OP. *_kantu_, *_kam_; Gk. *ependytēs* (?)) which was often belted;
- trousers, leggings or chaps (Gk. *anaxyrides*);
- footgear (which might sometimes be built into the trousers to form a kind of slipper-legging);
- a felt, cloth, leather or suede cap.[7]

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[2] See Llewellyn-Jones 2013: 217, 221, figs F10, F14.

[3] On the Egyptian *mss*-tunic see Vogelsang-Eastwood 1993; for arguments for the Elamite origins of the Achaemenid court robe see Root 2011.

[4] See Beck 1972; Goldman 1964; 1991; Kuhrt 2007: 532; Llewellyn-Jones 2013: 208, 210, 214, 217, 221.

[5] Athenaeus, *The Deipnosophists* 12.525d–e.

[6] Wu 2012: 78–90, figs 4.4, 4.6.

[7] See Llewellyn-Jones 2013: 220, fig. F13. There is little agreement over Greek and Old Persian clothing terminology. Hawkins 2013: 226 reads OP *_gaunaka_ as a 'thick cloak', although a cloak *per se* (i.e., an unstitched mantle) was not worn by Iranians in the Achaemenid period. For him the Gk. *kandys* is the Persian sleeved tunic. Miller 1997: 166 regards the *kandys* as a garment, 'worn from the shoulder by men as a kind of cloak in conjunction with a sleeved chiton ...; its most striking feature is the unused sleeves'. Miller uses the Gk. *ependytes*, which is 'linguistically Greek rather than foreign' for the sleeved tunic (or *chiton*). Schmitt defines the dress terms thus: '*gaunákē(s)*, also *kau-* 'Iranian cloak or blanket' (from OIr. *_gaunaka-_ 'hairy, shaggy'); *kándys* 'Median upper garment with sleeves' (with *kandytânes* 'clothes-bag', containing OIr. *-dāna-* 'holder')' (Schmitt

Figure 1. Achaemenid royal dress: Darius I at Bisitun (photograph: St J. Simpson)

Taken in combination, this ensemble was ideal for a people dependent upon horse-riding for transportation, warfare, status display, and many other forms of cultural identity (Figure 2).[8] The Greeks erroneously, but consistently, called this mode the 'Median dress' and, unfortunately and frustratingly, the tag has stuck in much contemporary scholarship, but there is no evidence for these garments being limited to the Medes.[9] The complete outfit is worn by several groups of tribute-bearers on the Persepolis Apadana staircases: Delegations I [Media]; IX [Cappadocia]; XI [Skythia –]; XVI [Sagartia or Armenia]), and Willem Vogelsang notes that, 'geographically, all of these trouser-wearing delegations derive from northwest, north, and northeast of the Achaemenid empire. They originate from the long belt of lands that stretches to the delta of the Danube in the west to the borders of China in the east'.[10] One fact cannot be stressed enough: these are the clothes worn by the traditional horse-riding peoples of the empire.

The Persians themselves strongly retrained the nomadic traces of Eurasian horse-societies. For the Achaemenids the horse had a significant practical and symbolic purpose and the importance of horses among the nobility is evidenced by the fact that many of them bore names compounded with the Old Persian word *aspa* – 'horse'. Several of Darius I's inscriptions note that Persia was a land containing both good men and good horses (DZe §1; DPd §2) and Herodotus famously states that Persian fathers were intent on teaching their sons 'three things: how to ride a horse, how to fire a bow and how to tell the truth'.[11] The premium Persian horses were bred in the alfalfa-rich plains of Media, and it was here that the main royal stud farms were located.[12] Most prized of all were those steeds bred on the plains of Nisaea near Ecbatana and Bisitun, and Nisaean horses became celebrated for their magnificence, fine proportions, and swiftness.[13] Nisaea is said to have sustained 160,000 horses, although stiff competition came from Media and Armenia which were also used for breeding good steeds, as were the provinces of Babylonia (where one satrap possessed 800 stallions and 16,000 mares), Cilicia (which provided an annual tribute of 360 white horses), Chorasmia, Bactria, Sogdiana, and lands of the Saka which provided the empire with its cavalry.[14] The Persepolis texts often speak of horses, usually in the context of their food provisions and maintenance but also as property of the king or members of his family.[15] The texts also name individuals who safeguarded the welfare of the royal horses as well as groups of court officials serving as Masters of the Horse, as it were, and show that these men operated within a hierarchical system and could be paid well beyond the average ration-rate and could enjoy a diet of regular meat.[16] This suggests a high rank at court for Masters of the Horse.

2002: 360), although the imprecise English dress terminology does nothing to help clarify matters. An additional Gk. term, *sarapis*, might also refer to a long-sleeved coat. See further discussion by Thompson 1965 and Widengren 1956.

[8] See further Llewellyn-Jones 2013: 83–85.

[9] See for instance Sekunda 2010. See also Schmitt 1990: 'The currently prevailing opinion is that the *candys* ... was part of the Median riding costume ... that is represented often in the Persepolis reliefs'.

[10] Vogelsang 2010: 351; see also Vogelsang 1992.

[11] Herodotus, *The Histories* 1.136; see also Strabo, *Geography* 15.3.18.

[12] Polybius, *The Histories* 10.70.

[13] Herodotus, *The Histories* 3.106, 7.40.

[14] Diodorus Siculus, *Library of History* 17.110; Strabo, *Geography* 11.13.7; 11. 13.8, 14.9; Herodotus, *The Histories* 1.192, 3.90.

[15] PF 1668–69, 1675, 1793; PFa 24, 29.

[16] PF1942, PF1943, PF1947, PF1948.

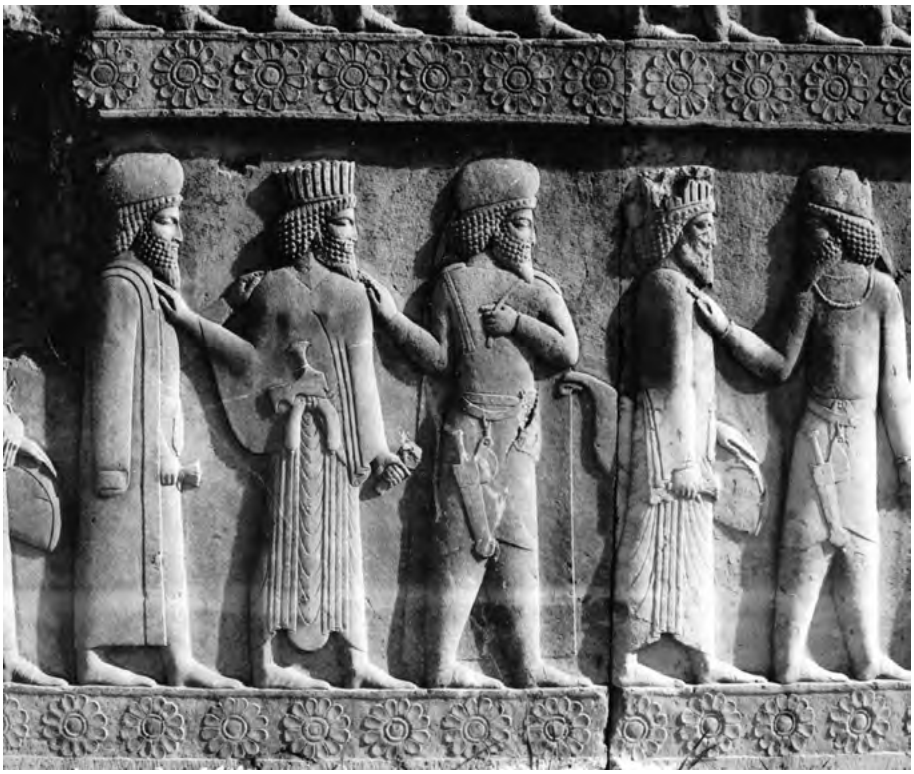

Figure 2. Forms of Achaemenid dress depicted at Persepolis: coats with false sleeves, loose belted gowns and belted riding costume (photograph: St J. Simpson)

A companion in life, the horse also played its role in the ceremonies of death and with the passing of a king or noble, his horse was included in the mourning procession with its mane cropped short.[17] The horse played a noteworthy role in Achaemenid rituals and beliefs and just as kings were mounted high on horse-drawn chariots, so Ahura Mazda and other deities had similar modes of transportation.[18] Moreover, just as the finest present to give a Persian was a horse, so were the gods honoured with equine gifts such as the white horses which were sacrificed to the sun and to the waters, both rituals being widely practiced amongst Indo-European peoples.[19] As founder of the empire, Cyrus II was honoured with a horse sacrificed to his soul every month. Moreover, the infamous tale recounted by Herodotus of how Darius I acquired his kingdom through a trick involving the neighing of his horse is, in all probability, a Greek misunderstanding of the Iranian practice of hippomancy, or divination through the behaviour of horses, demonstrating the deep-set importance of the horse as the *key* species in the Iranian consciousness.[20]

The coat-tunic-trouser outfit evolved in response to the horseback lifestyle of the Iranians which had developed in northern and eastern Iran and the wider steppes of Eurasia in the millennium or so before the apex of Achaemenid territorial power. Therefore, the labeling of this type of outfit as 'Median' is not only unhelpful, it is manifestly wrong. An alternative terminology needs to be employed: 'riding dress', 'cavalry costume' or some other suitably equine-related idiom, would, I propose, serve the purpose, for there can be no doubt that this fashion is indeed a projection of Iranian branch of the horse culture of Eurasia.[21] Oddly, however, Achaemenid monumental art never depicts the king wearing trousers or the *gaunaka*; he is always shown in the court robe, a symbol, I think, of his sedentary courtly Elamite-Achaemenid identity. In reality there can be no doubt that he did wear trousers and the sleeved coat too, if only as a practical way of hunting or traveling on horseback.[22] But there is something else going on to judge from the fact that the four groups of Greater-Iranian Persepolitan delegates who bring coats, tunics, and trousers as tribute gifts to their ruler is a court motif so well-established as to be repeated on the Nereid Monument from far-off Xanthos in Asia Minor.[23] Why is this so? Because the message which was conveyed through these garments was singularly important in the articulation of the two core aspects of royal identity, for as well as being the foremost Persian courtier in his splendid court robe, the Great King was the premiere Iranian horseman-nomad-chief too and

[17] Herodotus, *The Histories* 9.24; Curtius Rufus, *History of Alexander* 10.5.17.
[18] Herodotus, *The Histories* 7.40; Arrian, *Anabasis* 2.11, 3.15; Xenophon, *Cyropaedia* 8.3.12.
[19] Xenophon, *Anabasis* 1.2.27; Herodotus, *The Histories* 1.216, 7.113; 1.189; Xenophon, *Cyropaedia* 8.3.11–12; *Anabasis* 4. 5.35; Pausanias, *Description of Greece* 3.20.4; Strabo, *Geography* 11.13.7; 11.13.8, 14.9.
[20] Herodotus, *The Histories* 3.85, see also Ctesias, *History of Persia* F13 §17.
[21] Note important comments by Root 1979: 280, n. 147.
[22] Discussions in Summerer and von Kienlin eds 2010.
[23] Root 1979: 281, fig. 69.

was expected to dress appropriately.[24] The riding habit spoke of Persia's deep Eurasian nomadic ancestry.

The style and symbol of the *gaunaka*

Irene Good sensibly suggested that the *gaunaka* was a kind of overcoat with wide, often over-long, sleeves and that it was usually worn hanging from the shoulders.[25] One of the earliest attestations of the garment being worn this way dates to the 9th century BC in the form of a bronze stand found at Hasanlu in Iran, although the coat itself was ultimately derived from a very ancient rectangular garment shaped on the loom and known as the *chapan*; it is distinctly central Asian in style (Figure 3): the same coat style is found in early China and has a common origin.[26] Garments found in Achaemenid-era Scythian burials demonstrate how completely perfunctory the hanging sleeves might be, as they were cut and sewn thin and long so that no arm could be placed within them (Figure 4).[27] The fabric of the coat might have ranged from a tightly-woven three-quarter twill to piled and quilted fabrics used for warmth. The OP. *gaunaka* has the meaning 'hairy' or 'shaggy' (Avest. *gaona* – 'hair'), suggesting that the coat must have been made from wool, felt or fur (or was at least lined or trimmed with fur).[28] A painted

Figure 3. Man wearing a coat with false sleeves in an Afghan market (photograph: the late David Whitehouse)

tomb from Karaburun in northern Lycia shows a Great King, or more probably a satrap, wearing a white *gaunaka* lined with a thick white lynx fur.[29] All in all this denotes the *gaunaka* as a garment of considerable cost and a clear indicator of wealth and status and it was worn, therefore, exclusively by the elite. In fact, the Persepolis reliefs show it worn only by the nobility; food-bearing servants wear just the long-sleeved tunic with trousers.

It becomes clear from the Greek literary sources that the *gaunaka / kandys* played an important role in court etiquette and that the garment, which in Achaemenid art is usually shown draped over the wearer's shoulders with the sleeves hanging loosely at the sides, was loaded with ceremonial symbolism (Figure 5). The ultra-long sleeves (Gk. *korē*) were supposed to be used in the presence of the Great King and any suppliant before the throne was expected to place his arms into them and allow the excess fabric to fall over his hands, thereby rendering them harmless (since they could not grip weapons).[30] Failure to do this was read as an insult to the monarch or his representative, and Cyrus the Younger, we are told, used such an affront as an excuse to execute two of his powerful – and potentially troublesome – kinsmen:

[24] For Root 1979: 281 'it was a symbol for the king-as-warrior'. This has some cogency, but the fact remains that many seal images of battle show the king wearing the court robe, as unlikely as this may have been in reality since the bag tunic is unsuitable for combat. It must be stressed that the combination of cut, shaped and stitched garments which made up the Iranian coat, tunic, and trousers makes its first appearance in Western Asia during the early Achaemenid period in this particular form of equestrian costume. For the inhabitants of the old civilisations of Mesopotamia, Asia Minor, and Egypt, as well as for the Greeks – all of whom employed unshaped drapery as the fundamentals of their clothing – Persian riding dress was nothing short of revolutionary. The conspicuous covering of the body, a hallmark of Iranian self-identity across the millennia, was in marked contrast to draped and more routinely displayed bodies of the peoples of the western Achaemenid empire, and it is not surprising that the Greeks of the late Archaic and Classical periods in particular defined themselves in opposition to the Persian nemesis in terms of dress, a theme routinely found in Attic art, but one which also is articulated in literature. Herodotus (6.12) insists, for instance, that '[The Athenians] were the first Greeks, that we know of ..., to endure seeing Persian dress and the men who wore it', the suggestion being that, at best, this cut, shaped, and fitted Persian body-concealing form of dress was an eye-sore for the aesthetic sensibilities of the Greeks and, at worse, it solicited in them an inter-polis trauma. For the Greeks, Persian dress was barbarian costume *par excellence*. See further Llewellyn-Jones 2015. In spite of hostilities, the Greeks nevertheless fixated on the exotic otherness of Persian dress, and also willingly expressed their admiration for its unique beauty, and, as Margaret Miller (1997) has demonstrated, the long-sleeved *gaunaka* was enthusiastically imported into Greece where it became the fashionable must-have for the wives of the Athenian aristocracy (a clear play on the gender inversion the Athenians regularly spun around the figure of the Persian).

[25] See Good 2010; Schmitt 1990: 758, may be correct in criticising Widengren's identification of the kandys with Polish *kontusz* as 'linguistically anachronistic', but Widengren's term 'a great coat' may be the best suited to the *gaunaka*.

[26] Knauer 1978; 1985; 2003.

[27] See Rudenko 1970: 91.

[28] See Tavernier 2007: 188.

[29] Even if the figure is a satrap, we nevertheless get a good indication of the look of the royal coat, since satraps were expected to represent the king as closely as possible and therefore imitated his dress as closely as possible, given the limits of what was considered appropriate – see below. It is possible, of course, that the figure is of a local dynast who is deliberately Persianising.

[30] Xenophon, *Cyropaedia* 8.3.12.

Figure 4. Narrow leather false sleeve with appliqué excavated in kurgan 1 at Tuekta in the Altai mountains; 5th century BC, L 32.5 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2179/972)

Figure 5. A pair of miniature gold statuettes from the Oxus Treasure showing men wearing the **gaunaka* (The British Museum, inv. nrs 1897,1231.2/123902, 1897,1231.2a/123903)

> 'In this year, Cyrus executed Autoboisakes and Mitraios, the sons of (Darius II's) sister because, when they met with him, they did not put their hands into their long sleeves. Now, the Persians do this only as a mark of respect for the king; this type of sleeve is longer than a normal sleeve so when one puts a hand into it, the hand is rendered harmless'.[31]

[31] Xenophon, *Hellenica* 2.1.8.

While this type of story might be hyperbole on the part of Xenophon, showing as it does the capriciousness of Persian royalty, it does alert us to the possibility that, as in all sophisticated court societies – and Achaemenid Iran is undoubtedly a fine example of a highly civilised and visible royal culture – dress-etiquette really mattered.[32]

Other court ceremonies focused on the **gaunaka* too, in which this costly iconic court garment became an item of significant exchange in which notions of loyalty and patronage were codified, and through which gestures of humility, obedience, privilege, and status could be negotiated and played out. I refer here, of course, to the notion of investiture and the political importance attached to the custom of royalty bestowing the **gaunaka* as a robe of honour onto a worthy recipient.

The **gaunaka* as *kha'lat*

Luxury textiles have always contributed to the wealth and power of ruling dynasties and they have always performed important roles in the ceremonials of state.[33] Pageantry introduced in the Achaemenid era was reimagined in Sasanian ceremonials which, in turn,

[32] Decked out in their finery, Achaemenid courtiers clearly cut fine figures; all the more humorous therefore is Xenophon's vivid account of them, all bedraggled and mud-splattered, attempting to free baggage wagons from the quagmire of an impassable road. Xenophon, *Anabasis* 1.5.8: 'At one time they can across a very narrow muddy place where the going was tough for the carts. Cyrus [the Younger] halted with his entourage of courtiers and commanded Glous and Pigres to take some men from the barbarian troops and get the carts free from the mud. But he thought they were taking too long over the job and so, pretending to be angry, he told the Persian nobles in his entourage to help the carts get a move on. It then became possible to see a wondrous thing: they allowed their long purple coats to drop to the ground without caring where they stood and sprinted, as if they were running a race down a very steep hillside, while wearing their expensive tunics and trousers, with some of them even wearing necklaces and bracelets on their arms. As soon as they got there, they jumped into the muck in all their finery and heaved the carts free from the mud more quickly than would ever be thought possible.'

[33] There is yet to be a systematic cross-cultural study of dress and textiles in court societies but individual studies must include: Arch and Marschener 1987; Chrisman-Campbell 2015; Dawson and Sumner 2015; Dickinson and Wrigglesworth 2000; Eraly 2007; Ertug and Baker 2000; Hayward 2007; Kumar 1999; Losty and Roy 2012; MacKie 2015; Ming 2010; Rose 2001; Vogelsang-Eastwood 1999; Zawadzki 2006.

was influenced by Byzantine ceremonial and went on to inform Umayyad and later Islamic royal rituals. There is, I would argue, a direct line of influence from the Achaemenids to the Ottomans, Safavids, and Mughals in which textiles – clothing, carpets, hangings and tents – were visible everywhere as extravagant but vital displays of court wealth and monarchic power.

We know that in the Islamic period, clothing, furnishing fabrics, and tents were stored in imperial treasuries as major financial assets of dynastic rule.[34] There is every reason to believe that pre-Islamic Iranian courts kept large stocks of textiles too, as suggested by texts from early 6th century BC Susa which record, for instance, supplies of *kuktum* garments – a type of finished shirt or coat (*ku-uktum/tu*) made of linen or cotton[35] – coming into the royal palace from a diverse array of places scattered throughout Neo-Elamite territory.[36] In both the pre-Islamic and Islamic courts, textiles and completed articles of clothing were bestowed by rulers on their courtiers, visiting dignitaries, or other deserving people as marks of high honour, as a way of securing loyalty, and of securing legitimacy. As Stewart Gordon explains, 'At its simplest, a king or his representative bestowed on another person ... an outer [garment] ... In a robing room adjacent to the court, the recipient donned the ... outfit, re-emerged to the acclaim of the assembled nobles and – if not so before – was deemed "suitable" to take his place in court'.[37]

This type of ceremonial gifting of robes was practised in Iran from the Achaemenid period into the Sasanian era, while in the Islamic period, the practice spread far and wide throughout the Middle East and Asia. At this time both the ceremony and the garment gifted during the ritual were known by the Arabic term *khil'at* (sing. *khil'a* – 'to take off') or, in a standard Persian pronunciation more fitting to this study, *khal'at*.[38] We have, sadly, no means of knowing the original Old Persian term for this honours ceremony (although I am in no doubt that there was one). While robing ceremonies themselves no doubt evolved and changed over the centuries, the fundamental importance of *khal'at* never changed – the gifted robe served as a bond between superiors and subordinates.[39]

Underpinning the notion of *khal'at* was, of course, the concept of reward, a theme clearly propounded in Darius I's Bisitun Inscription: 'The man who cooperated with my house (*viθ*), him I rewarded well; he who did injury, I punished thoroughly',[40] and again on his tomb at Naqsh-e Rustam: 'What a man does or performs ... with that I am satisfied',[41] which finds parallel with Xerxes', 'I generously repay men of good will'.[42] The reward is physically expressed through the gift, and in Achaemenid ideology the interplay between service and the gift was profound since the monarch was perceived as receiving the gifts of his people in the form of loyalty, service, and produce.[43] *Khal'at* was a logical expression of the loyalty gift.

The features of *khal'at* identified in Arabic and Mughal sources are clearly apparent in the earlier Greek and Hebrew texts which focus on Achaemenid court practices; the Great Kings of Persia employed the same techniques of largess for the same political purposes as their Islamic-era successors, although remarkably, this has by-and-large been overlooked by Gordon Stewart in his important studies of the world-wide history of investiture. He argues that the formation of this courtly tradition belongs to the Han Chinese and, subsequently, to the Iranian Sasanians, but surprisingly he overlooks the corpus of evidence relating to the Achaemenid *khal'at*.[44]

But the evidence is rich: Xenophon, for instance, records clearly the way in which a Great King expressed his favour to a courtier through the use of gifts: 'Cyrus presented him with the customary royal gifts – that is to say, a horse with a gold bit, a necklace of gold, a gold bracelet, and a gold scimitar, (and) a Persian robe [i.e. a **gaunaka*]'.[45] This formalised gift-giving of 'unequal exchange' as Pierre Briant terms it, bears a striking resemblance to an Honours List for courtiers articulated in the Hebrew bible's Book of Esther:

[34] Harun al-Rashid (786–809), for instance, had a textile treasury which included 40,000 items of dress, 8,200 furnishing fabrics, 3,900 carpets, 1,300 hangings, 3,000 cushions, and 4,000 ceremonial tents (MacKie 2015: 45).

[35] Hinz and Koch 1987: 559.

[36] Henkelman 2003; Potts 1999: 299.

[37] Gordon 2010: 462.

[38] More obscure Persian terms such as *pay-zeh* and *sarupa* ('from head to foot') might also be used. For discussions of *khal'at* see especially Gordon 2001; Gordon ed. 2003; see also Gordon 2010: 462–67.

[39] For the *longue durée* of gift giving in the Middle East, Eurasia, and China see Komaroff ed. 2011: 13 where she notes that, 'In Arabic and Persian, there are all kinds of nuanced words that we don't have in English that describe if it's a forced gift, or from a lower ranking official to a higher ranking, or one given to curry favour. It kept the wheels greased. People preferred to give gifts than fight battles'; for the classic account of gift-giving see Mauss 2002; Satlow ed. 2013.

[40] DB §63.

[41] DNb §8e.

[42] XPl §26.

[43] Of course the king was master of the empire and thus the conquered lands of his realm *ipso facto* came under his authority (the Old Persian word for 'land', *būmi*, has the implication of 'land under royal right') and as such the king expected payment of tribute and taxes from his subject peoples. These fiscal obligations to the throne, 'the king's share', were called *bāji* (Old Persian) and *baziš* (Elamite; see Sancisi-Weerdenburg 1998: 33; Briant 2002: 398, 439) and were made up from a portion of produce from lands under the king's jurisdiction. It is worth citing Allen 2005: 120 who sensibly notes that, 'the terminology distinguishing gifts from tribute ... may have been the result of diplomatic rhetoric ... The boundaries between the concepts of land-obligations, tithes, tribute, and gifts were likely to be very fluid'.

[44] Gordon 2010: 462; although he acknowledges the episode in Esther 6, Gordon's focus remains on the early Chinese and Sasanian sources.

[45] Xenophon, *Anabasis* 1.2.27.

> 'Have royal robes brought which the king has worn, and a horse on which the king has ridden; put a gold circlet on his head. The robes and the horse should be handed to one of the king's noblest officials, and he should clothe the man whom the king wishes to honour and lead him on horseback through the city, proclaiming: "This is the man whom the king honours"'.[46]

The act of gift-giving was an important tool for the Achaemenid monarchy, as it established as system of debt and dependency on the part of nobles and other courtiers. Moreover, courtiers designated as 'friends of the king' had the right to eat from the royal table or assist the king as a body servant and these were highly prized and ferociously policed privileges.[47]

However, not all who aspired to the honour were worthy of *khal'at*, as a story recounted by Plutarch (possibly taken from Ctesias) makes clear. It concerns a Spartan named Demaratus, who had defected to Persia and had become one of the Great King's benefactors:

> 'And when Demaratus the Spartan, being encouraged to ask for a gift, asked that he might ride in state through Sardis, wearing his *tiara* upright after the manner of the Persian kings, Mithropaustes the King's cousin said, touching the headdress of Demaratus, 'This *tiara* of yours has no brains to cover; you'll not be Zeus just because you hold a thunderbolt'.[48]

The story of royal benefaction found in Esther finds, in fact, many parallels in the Greek corpus. Xenophon believed that it was Cyrus who began this practice of lavish gift-giving (*polydoria*), but ever since Cyrus' time, generosity became one of the hallmark of the qualities of Achaemenid kingship.[49] Although this Cyrus-centred aetiology might be doubted, nevertheless stories of Cyrus' largess create a picture robe-gifting on an imperial scale:

> 'Cyrus began the practice of lavish gift-giving ... Who is known to adorn his friends with more beautiful robes than the king? Whose gifts are so clearly recognized such as the bracelets, necklaces, and horses with gold-studded bridles as those which the king bestows?'[50]

Xenophon's Cyrus frequently resorts to the gifting of robes, gold, weapons (such as daggers, bows, arrows, and quivers) and, of course, fine horses; these items form the archetypal imperial honour-gift.

The sheer number of gifts suggests that the imperial workshops and stables were kept occupied. Before a major parade, for instance, Cyrus is supposed to have 'distributed amongst the nobles the most beautiful robes, Median coats [i.e., *gaunaka*], for he had a great many made, with no lack of purple dye, red, and scarlet, or sable' and Herodotus notes that, 'Every year a suit of Median clothes [i.e., the riding habit] and other gifts held to be of great value' was distributed by the king to his loyal courtiers.[51]

No doubt jobs at court endowed a courtier the right, probably the obligation, to wear special **gaunaka* as a kind of royal livery and courtiers took their right to wear *khal'at* garments seriously: the eunuch Mithradates, rewarded by Artaxerxes II for his services during the battle of Cunaxa, never failed to appear in public without his royal coat and his gifted jewellery, prompting an envious eunuch to declare: 'A magnificent outfit indeed, Mithradates, is that which the king has gifted you! The necklaces and bracelets are glorious, and your dagger (*akinakēs*) of immeasurable cost! He's made you happy, the object of every eye!'[52] And in a similar manner, Artapates, Cyrus the Great's loyal sceptre-bearer 'had a gold dagger, and wore a necklace and bracelets and all manner of ornaments which noble Persians put on; for he was honoured by Cyrus because of his affection and steadfastness.'[53]

Briant notes that, 'these robes and jewels were not baubles; they were resplendent marks of the king's favour... [T]he royal gift was symbolically charged ... With all of the Persian nobles wearing sumptuous robes and prize jewellery, we should not be surprised that the ceremony of awarding gifts was held in public.'[54] Indeed, the honour bestowed upon Mordecai is amplified through the centrality of the public aspect of the ceremony – in particular the horseback ride through the royal city. This accords closely with the central Asian *khal'at* practices studied by Stewart Gordon. There is little to challenge his notion that Eurasian robing customs entered into Persia via the nomadic peoples of the steppes and beyond; indeed the more we push the Iranian-Eurasian nomadic connection, the more we are able to understand the minutiae of Achaemenid

[46] Esther 6.5–9.
[47] The title 'friend of the king' had a long pedigree in the Near East, and it is particularly well-attested in the Hebrew Bible (2 Sam. 15.37; 1 Kgs 4.5, 16.11) and in Akkadian texts as *rukhi šarri*. The title does not seem to have implied any specific function, but being a 'friend of the king' was clearly a closely guarded privilege and a source of pride for those who bore it; thus Tiribazus, the powerful satrap of Armenia, was a particularly favoured 'friend of the king' (Artaxerxes II), and, when resident at court away from his satrapy, 'he alone had the privilege of mounting the king upon his horse' (Xenophon, *Anabasis* 4.4.4; see further Curtius Rufus, *History of Alexander* 3.3.14.21 and Briant 2002: 321.
[48] Plutarch, *Lives: Themistocles* 29.5; discussion by Heltzer 1994.
[49] See discussion by Briant 2002: 305, 308.
[50] Xenophon, *Cyropaedia* 8.2.7–8.
[51] Xenophon, *Cyropaedia* 8.3.3; Herodotus, *The Histories* 3.84.
[52] Plutarch, *Lives: Artaxerxes* 15.2.
[53] Xenophon, *Anabasis* 1.8.29.
[54] Briant 2002: 307.

culture.[55] According to Gordon the *khal'at* traditions of Central Asia followed six distinct norms:[56]

- presentation of *khal'at* was highly personalised and the gift of luxurious robes reinforced the relationships between a leader and his men;
- the robe was granted from the hand of the leader before the whole band of nobles, representing solidarity with that band, cross-cutting family and dynastic ties; in other words, those distinguished through the wearing of gifted robes formed an elite club;
- the robe was given in conjunction with traditional items of war: daggers, swords, bows, arrows;
- a central and enduring connection existed between robing and horses as well as highly decorated horse-trappings;
- as an indicator of wealth and status in itself, the robe was nevertheless always accompanied by something gold (weaponry, jewellery, horse trappings);
- the *khal'at* robe was always a shaped and sewn garment rather than a wrapped or draped one, and it was always compatible with horse riding; in fact, in many of its later manifestations the robe of honour often had side- or back-slits for ease of riding. It was always the outermost and most visible garment of court dress.

Each of these indicators, qualified by Gordon as the non-negotiable, absolute, features of central Asian *khal'at*-style investiture are comfortably located in the Achaemenid-era evidence. So much so, in fact, that it becomes clear that the Achaemenids should take their rightful place in the early, indeed formative, period of *khal'at*-history. But the Achaemenid evidence provides even more thought-provoking materials and a further examination of a specific detail of the Achaemenid *khal'at* will go some way towards helping us understand the sense of reverential awe which was activated when in the presence of these special garments.

The royal **gaunaka* as talisman

Further understanding of the nature of *khal'at* emerges when we focus again on the wording of a specific sentence in the Esther passage: Haman pronounces that royal robes 'which the king has worn' should be brought and gifted to the worthy recipient. This is an important detail. The highest level of *khal'at*, it appears, was to receive a robe from the royal wardrobe which had been worn by the king himself. Not all courtiers were guaranteed this privilege but chosen were quite literally touched by, and with, majesty – that special, sacred *charisma* known as *farr* or *khavaneh* which oozes into and out of the body of the king. The ancient Iranian concept of a demi-mythical force wherein God bestowed upon the kings of Iran a mystical light (*farr-ī īzadī*) that legitimized their rule was so strong that it can be thought of as emanating from the royal body, permeating his garments, and making them hallowed. This is best seen in the accession ceremonies of the Achaemenid monarchs.

When a Great King of Persia died, his body was mourned, prepared for burial, and finally interred in a rock-cut tomb. Then the ceremonies of a royal investiture could begin and a new monarch could take his place upon the throne and begin the process of governing his empire. Greek authors knew something of the cultic rituals that surrounded this important ceremony, but much of its details were lost to them although it is clear from the writings of Plutarch (following Ctesias' first-hand observations) that some kind of accession ceremony was enacted at Pasargadae, the traditional tribal homeland of the Persian monarchy.[57] It was here that Cyrus himself was buried and it was here within the tomb that the accoutrements of Cyrus' kingship, including his clothing, were stored.[58]

At the shrine of Anahita, and in the presence of a few select courtiers and Magi, certain rituals were enacted which conferred the legitimacy and sanctity of kingship upon the monarch. At the royal investiture, the new Persian king adopted an official throne name and symbolically took on a new 'body' and it was the investiture ceremony rather than the physical birth – or even the death of the previous king – which marked the moment when the king became a different, more august, person. Accordingly, during the ritual he was 'given' a different anatomy and underwent a classic rite of passage of 'exclusion-inclusion' which was expressed through his undressing, his donning of symbolic garments, his eating of specific foods, and the imbibing of ritual liquor (terebinth, milk, *haoma*), another undressing, followed by his dressing in new garments to symbolise an altered state of being. The Achaemenid monarch actually underwent two symbolic *khal'at* rituals himself, while the drinking of the sour milk and the acts of ingesting humble foods and hallucinogenics confirmed the initiate's liminal status, as did the new king's dressing in the pre-monarchic, tribal clothing of Cyrus.[59] Humility and humbleness were stressed in the ritual as the monarch was reminded of his tribal nomadic ancestry and only afterwards, when the king donned a robe of state, was his new monarchic brilliance, strength, and vitality confirmed.

[55] An idea inherent in Potts 2014.
[56] Gordon 2001.
[57] Ctesias F17 = Plutarch, *Lives: Artaxerxes* 3.1–4.
[58] Arrian 29.1–11.
[59] Sancisi-Weerdenburg 1995.

We are meant to think of Cyrus' garment as a **gaunaka*. By donning Cyrus' coat every subsequent Great King became an extension of Cyrus and after he had removed the precious relic, the new king was then re-clothed in a newly-made riding coat – richly dyed and beautifully worked with exquisite designs – which signified his nomadic horseman ancestry, his new status as warrior king, and confirmed his right to rule. As the king put on his new *gaunaka*, he donned the power of rulership.[60]

Thereafter any *gaunaka* worn by the king became imbued with the profound religious aura of the royal *farr*. Curtius Rufus notes that the costliest version of the garment was purple, white, and gold and was decorated with the 'motif of gilded hawks attacking each other with their beaks' – no doubt his mangled interpretation of the winged Ahura Mazda-symbol. It was this ensemble which, Ctesias notes, struck the Persians with an almost religious awe (*thaumaston*), for the Great King's **gaunaka* was a talisman.[61] When Cyrus the Younger plotted to kill his brother Artaxerxes II, he was unable to strike the death blow while the king was wearing this garment since it acted as a kind of protective force-field around the royal body.[62]

The true significance of the robe as a manifestation of the kingship itself is the key to understanding the bloody story Herodotus tells about Xerxes' robe, behind which no doubt lies a Persian account of Masistes' attempt to usurp the throne (Herodotus' audience would probably have known that Xerxes himself was assassinated in a court coup, thereby adding significance and irony to the story).[63] The very real paranoia lying behind the idea of usurpation and its relationship to the royal robe is likewise encountered in a Persian story told by Deinon which has the ambitious and treacherous Assyrian queen Semiramis trick her weakling husband into lending her his royal garment which she subsequently refuses to return.[64] Even when ripped or tattered the king's robe possessed extraordinary powers: one courtier, Teribazos, managed to get hold of one of Artaxerxes II's cast-offs and wore it openly in front of the court. But he escaped the death sentence which naturally accompanied such a rash act because of the king's benevolence and because Teribazos was prepared to debase himself by playing the fool in front of the king and was thus exonerated of treason.[65]

The king's **gaunaka* was uniquely his. An aetiological legend recounted by Xenophon tells how Cyrus the Great received the prototype royal robe from the daughter of the Median king, whom he then took as a wife and the robe, it is suggested, bestowed the kingship of Media on Cyrus.[66] Thus there is little doubt that the Persians believed the Great King's robe to have possessed the supernatural powers of monarchy. Xerxes, troubled by dreams, instructed his uncle Artabanos to put on royal clothes and to sleep in the king's bed, and, as Artabanos slept, the same apparition that had visited Xerxes came to Artabanos too, now decked out in the paraphernalia of royalty and imbued with the requisite aura of majesty.[67] Alexander of Macedon's careful employment of articles of Persian royal dress following his defeat of Darius III is best understood in this light and suggests that he wanted to be acknowledged as a legitimate Great King.[68]

The idea that a magical sympathy exists between an individual and his clothing was acknowledged by James Frazer who noted a primitive belief that, 'whatever is done to clothes will be felt by [a] man himself'.[69] To honour a favoured courtier what better gesture of respect might a king proffer than to offer him a robe which had touched his own royal person? If Frazer is correct, then the recipient experiences, however tentatively, a moment of that sacred mystery of monarchy. Clothing touched by a king who had himself touched the **gaunaka* of the great Cyrus was transferred to a worthy recipient in a public ceremony of high prestige. For that moment, the courtier shared a union with Cyrus and with the line of kings who followed him; he became part of an elite clan. The gifting of clothing is a bonding moment and works in two directions: the king accepts robes of delegates, thereby acknowledging his place in the horseman tribal societies of Greater Iran, and in turn he hands out robes, thereby bringing outsiders into the inner orbit of the Achaemenid clan.

Conclusion

The ceremonies of robe-gifting allowed the noble recipients of *khal'at* to share in the special aura that the royal garment expressed. As I have argued, *khal'at* gifts were not given to the recipient by the king as arbitrary tokens of royal favour; they carried within them the image of Achaemenid kingship itself. The recipient who wore the royal robes was 'touched' by the monarch's 'spirit' – his *charisma*, *farr* or *khvarenah* – which was retained and carried within the royal gift.[70] The magical and spiritual bond which royal gifts

[60] Xenophon, *Cyropaedia* 8.3.13–14; Curtius Rufus, *History of Alexander* 3.3.17–19.
[61] Curtius Rufus, *History of Alexander* 3.3.17–19; Ctesias F45pγ.
[62] Ctesias F17 = Plutarch, *Lives: Artaxerxes* 3.5.
[63] Ctesias F17 = Plutarch, *Lives: Artaxerxes* 3.1–4; Herodotus, *The Histories* 9.109–11; see comments by Sancisi-Weerdenburg 1983: 28–29.
[64] Deinon F7 = Aelian, *Historical Miscellany* 7.1.
[65] Plutarch, *Lives: Artaxerxes* 5.2.
[66] Xenophon, *Cyropaedia* 8. 5.17–19.
[67] Herodotus, *The Histories* 7.17.
[68] Plutarch, *Lives: Alexander* 45.2; Diodorus Siculus, *Library of History* 17-77.4–5.
[69] Frazer 1911: 207.
[70] Mauss 2002: 9; as Mauss informs us, in Polynesia the *hau*, namely the spiritual power that each gift retained, emerged as one of the *leitmotifs* of Maori gift-giving customs; for Iranian concepts see Lubotsky 1998.

created, enabled the Great king to establish a ring of dependence, loyalty and control of the nobles and his subject-peoples as well. This is why Achaemenid monarchs, following long-established central Asian traditions, often transferred, in public ceremonies, the horse-riding clothes which they themselves had worn to individuals whose competence, honesty or bravery pleased them. The nomadic essence of the horse-peoples of Eurasia was codified in the garments of the Achaemenid Persians who, drawing upon tribal identity, thereby utilised those clothes as sophisticated tools in court ceremonial.

Scythian archery

Mike Loades[1]

Abstract

This paper includes observations on Scythian archery practices and equipment, particularly horse archery, which derive from the author's practical experience of riding and shooting with replica equipment, as well as the evidence of both art and archaeology. It examines in turn evidence for the Scythian bow, *gorytos*, thumb draw, arrows and horse archery, and adds a fresh perspective on some relevant passages referring to Scythian archers in Classical written sources. It concludes with some comments on the Scythian legacy to Parthian horse archers.

Keywords: Scythian bow; *gorytos*; thumb draw; Scythian saddle; Scythian arrows; *Scythicon*; horse archers

Introduction

Evidence from archaeology, art and ancient written sources are the foundation of all knowledge regarding early cultures. However, the picture is often incomplete, sometimes contradictory and always requires interpretation. That is where making replica artifacts and handling them can throw light on these investigations. Such explorations are never more than a lighting device: they are not in themselves evidence of anything but they can help us to see and dispel some of the shadows. As regards military equipment, much depends on the skill and strength of the present-day individual who is using it. Failures and inabilities by modern man do not signify that certain things were not possible for the young warriors of antiquity but when the present-day experimenter succeeds with a technique or achieves a certain result, when a system of use makes sense of things, then such a methodology must have been available to the culture in question. It is a matter of seeing how it all fits together which establishes our best guess at practice. We now look at some of the evidence relating to the Scythians, particularly their mastery of the bow and skill as horse archers.

The Bow

There is a trend in some art depicting Scythians for the bows to seem rather miniscule. This has led to the supposition that they were that small in reality but this is an assumption which needs to be viewed with caution. The length of a bow certainly has a direct correlation with the possible length of the draw and the popular presumption of tiny bows has led to a corresponding belief that the Scythians used short arrows. Neither of these ideas are born out by the archaeology. Many Scythian arrows have been found are in the 30–31 inches range and the few bows or fragments of bows discovered are comparable to the shorter types of composite bow from other cultures, which nevertheless are capable of being drawn to the ear (Figure 1). The mechanics of the Scythian design have also been found to work very well with a bow of around 45 inches (strung). The American bowmaker Jason Beever has produced a lot of replica Scythian bows, using traditional materials (Figure 2). His bows, typically 45 inches in length, have been measured at 85 lbs at 32 inches and 103 at 34 inches, illustrating that both the materials and the geometry of the Scythian bow are capable both of a long draw and of delivering a military draw-weight. There is nothing inherent in the design which would limit making reasonably sized, powerful bows.

Why then might they be portrayed so often as smaller bows in art? We may hypothesise and begin by looking at an especially iconic piece: a little gold plaque portraying two archers back-to-back excavated in a massive kurgan at Kul-Oba (Figure 3).[2] It is an intricate piece of worked gold and there may be mechanical limitations with this medium in producing bows of greater size; the limbs would be far too fragile and snap off. We also see this image of smaller bows in some, though by no means all, painted art. In these circumstances it may be that the bow is purely emblematic; there to signify that the subject is an archer. It is an identifier but, as an object, has less status than the human it defines and is therefore rendered at a lesser scale. There may be other conjectures. What is certain is that there are inconsistencies of size in art depicting Scythian bows but, to date, the archaeological evidence is fairly consistent.

The Scythian bow is the most complex design of all composite bows, not only in its extremely recurved

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[2] Simpson and Pankova eds 2017: 206–207, cat. 119.

Figure 1. A rare Scythian bow in extraordinarily good condition dated to the 5rd–3rd centuries BC. Unstrung it spans 44 inches, which by composite bow standards is not an unusually short bow. The sinew layers are visible and there are traces that show that it was originally covered in birch bark (image courtesy of Hermann Historica auction no. 72, Traditional Archery and Crossbows – The Karl Zeilinger collection, lot 3001, Munich 21st April 2016)

Figure 2. Parts of the wooden and horn core laid out before assembly and the application of sinew. This layout, produced by Jason Beever, gives an idea of the complexity of these bows. Such elaborate construction shows an advanced appreciation of mechanical principles that must surely have been intended to produce bows of military effectiveness (photograph courtesy of Jason Beever)

profile but also in its cross section. This was a highly engineered bow, manufactured with painstaking craftmanship; it would make no sense for it to be other than a high-powered weapon of significant power.

The *gorytos*

The *gorytos* is the Greek name given to the distinctive bow-case/quiver combination used by Scythian archers. Many *gorytoi* were embellished with a highly ornamented face-plate, usually in gold, such as the splendid example found in the Macedonian tombs at Vergina from the latter part of the 4th century BC. Whether on horseback or on foot, Scythian archers are portrayed in art wearing the *gorytos* on a belt at the left hip: it faces rearward and is suspended by a single strap (Figure 4).[3]

In all other cultures the quiver is set on the right hip, from which arrows can be drawn easily with the right

Figure 3. A small gold plaque depicting two Scythian archers back-to-back from the Kul-Oba burial mound near Kerch. They have extremely short bows and are either only partially drawn or are using a very short draw. This iconic piece is widely published and helps foster a belief that the Scythians had small bows. The piece is a mere 3¼ inches in height. It was originally part of a larger set that would have been stitched onto a garment as decoration (The British Museum, inv. nr. 1909,0617.2)

[3] Vos 1963: 49–50, pls IV, XIVb–XV; Chugunov, Ryabkova and Simpson 2017: 196–97, figs 122–25.

Figure 4. Gold drinking vessel from Kul-Oba, a 4th century BC Scythian kurgan in the Crimea. The mode of suspension for the *gorytos* is shown clearly and sits on the left hip. The figures on the vessel represent a Scythian creation myth concerning a challenge to string a strong bow. Here we see one of the contestants suffering from a broken tooth where the bow presumably struck him in the face and on the adjacent panel another is having a shattered shinbone bandaged. The author has a broken wrist as a result of a wrestling match with a powerful bow which he lost whilst trying to string it and thus understands at first hand the hazards involved. Composite bows take skill to string and the heavier the bow the harder it is: the slightest twist and the bow wrenches out of the hand and delivers a reprimanding strike to the errant archer (The State Hermitage Museum, St. Petersburg, inv. nr. K.O.11; photograph by Vladimir Terebenin)

hand. The positioning of the Scythian *gorytos* on the left hip begs the question of how the archer drew his arrows. Suggestions range from reaching behind the back, to turning the *gorytos* to face forwards, to drawing arrows with the bow-hand. In order to assess the merits of these propositions the author made an approximate reconstruction. The capacity of the arrow compartment was made to a generous size because many grave finds have suggested several dozen arrows were carried. This had the consequence, as the quiver was emptied, of creating a great ratting din with the remaining arrows, which was both annoying and distracting. A simple solution was to stuff the quiver with hay, though if broadheads had been used, I am sure that grass-seeds would have been equally effective.

Whilst possible to reach behind to take arrows, the author found this to be relatively slow and slightly awkward on horseback. The idea of turning the *gorytos* was not viable because it quickly returned itself to its natural orientation. Besides, having the arrows facing forward creates an unnecessary hazard to the horseman, who would be porcupined in the face were he to fall. Of course, brave men would not shrink from the dangers of the battlefield but nor are they likely to design their kit to cause such easy jeopardy.

When wearing a replica *gorytos*, the author was immediately aware of how well it balanced (Figure 5). Whether with or without the bow and as the weight changed when arrows were used, the angle of suspension barely

Figure 5. Author wearing replica of *gorytos*: not only does the *gorytos* balance well for the horse archer but it is equally suited for the infantry archer. The single strap allows for small adjustments by sliding it along the belt. When running on foot the important thing is to keep the lower leading edge further forward than the extension of the leg; in this way there is no risk of entanglement. It can be nudged a little forward if extreme motion is anticipated or nudged a little back for an optimum shooting position (photograph by Kim Hawkins)

registered any alteration. The broad single strap, about one third from the top, balanced it precisely. A clue that suggests an ability to finesse that balance even further may be in an account of Scythian practices credited to the 3rd century BC historian Phylarchus. He related that Scythian braves would put stones in their quivers: black stones for a bad day and white stones for a good day.[4] Clearly it wouldn't take too many days, of either eventuality, before the quiver became unduly heavy, which makes the anecdote slightly suspect. On the other hand, the story may indicate the existence of a practical custom of balancing a quiver with small stones that subsequently acquired a mythology. It seems a plausible idea.

The author found that by far the easiest and most intuitive way to draw arrows from the *gorytos* was to take them with the bow hand. The cutaway at the front of the quiver lines up precisely to where one's hand falls and equates to exactly the optimum position on the shaft to take it. It is a very swift and easy matter, with bow in hand, to use the thumb together with the index and middle fingers to withdraw an arrow, which then sits on the right-hand side of the bow. The right hand then takes the nock and positions it on the string. With just a little practice this becomes an extremely smooth, flowing and ergonomic action.

Figure 6. Replica bronze Sarmatian thumb-ring, made by 'Custom Thumb Rings'. Dated to around AD 100, the original was discovered by archaeologists in the Ukraine in 2015. It is the earliest known solid ring to have been unearthed outside China. The Sarmatians are generally considered to be descendent from the Scythians and it seems highly probable that they would have used a similar style of ring. It incorporates an eye for a lanyard. Practical trials indicate that this either attached to the base of the thumb (a few strands of sinew would suffice) or that a cord attached to a separate wrist strap. The most notable feature of this style of ring is the very short shield. When using a replica, the author found this to be especially beneficial as it gives unencumbered 'finger-feel' for rapid nocking techniques: this is ideal for horse archery (photograph by Kim Hawkins)

Thumb-draw

The equipment informs us how it is best used and the practical trials make it clear that the above is the obvious method for withdrawing arrows from the *gorytos*. That, in so doing, the arrow is positioned on the right-hand side of the bow gives a strong suggestion that the Scythians shot with a thumb release of some sort (with the thumb-draw the arrow is situated on the right-hand side of the bow). The argument against this is that, archeologically, no thumb-rings have been found to date (Figure 6). Absence of evidence is not evidence of absence and it is equally true that no finger protectors have been found to support the idea of a three-finger loose. Much of the art is inconclusive, though in some instances it appears to show a version of the thumb-draw whereby the string passes between the index and middle fingers. Like anything unfamiliar, it feels awkward at first but I have tried it and it can be done. A thumb draw makes the most practical sense for those engaged in horse archery. It is a technique whereby the index finger of the draw-hand braces the arrow against the bow, holding it securely no matter how much the rider is jolted by a plunging, spirited horse. It also offers a different sighting window to that of the finger-draw archer. With the latter the arrow is on the left-hand side of the bow and is aimed within the archer's peripheral vision. Whereas with a thumb-draw, in which the arrow is placed on the right-hand side of the bow, the archer aims with both eyes over the left-hand side of the bow without the arrow in peripheral vision, enabling a more intuitive and instinctive aim suitable for variable distances and moving targets. Scythian thumb rings may have been made from leather that may have decayed or a solid example may yet be found. Either way it seems probable that the design would have been similar to the Sarmatian ring unearthed in recent years in what were once Scythian lands. It is of paramount importance for a horse archer to be able to shoot with either hand. Drawing and nocking the arrow for the ambidextrous archer is an easy operation with the *gorytos*; the archer simply holds the bow in his right hand and can withdraw from the quiver with his left in the usual way.

Scythian archers in Athens

There are a few Athenian images purporting to represent Scythians that have caused confusion regarding the operation of the *gorytos* because they show it suspended by a baldric and facing forward (Figure 7).[5] However, these images were created by Athenian artists representing Scythians as 'exotic' foreigners and are unreliable for detail. Indeed, the artists may never have seen either a Scythian bow or a *gorytos*. Although

[4] Phylarchus, *Die Fragmente* 81 F 83.

[5] E.g., Vos 1963: pls Ib–II, VIb–IX; Ivanchik 2005*a*; 2006.

the images are beautifully executed, they represent fantasy 'dress-up'. They are bogus historical images from the same mould that we use to create inauthentic images in print and film today: to an Athenian, the Scythians were often figures of fun.

In the 5th century BC, 'Scythian archers' formed a proto-police force in Athens.[6] At first 'archers' seem an unlikely choice to impose civil order: arrows flying through the streets does not sound like a good idea. It is probable however that the word 'archer' was used to describe these Scythians as a signifier of their ethnic type, rather than suggesting that they literally carried bows in the streets. Classical Greek literature is full of references to these 'archers' beating people and hog-tying them; there are no references to them shooting their bows, and Herodotus himself gives an instance of Scythians using whips to this effect among themselves:

> 'I think we should put down our spears and our bows, and each one of us pick up our horsewhips and really lay into them with those. For as long as they see us with weapons in our hands, they can fancy themselves our peers, of a birth quite as good as our own. But if they see us carrying whips rather than regular weapons, it will dawn on them that they are our slaves – and then, when they have learned that lesson, it will put an end to all their resistance'.[7]

Figure 7. Athenian plate representing a Scythian archer. This image and one or two other similar images present a problem. At first glance it supports the idea that the Scythians turned their quivers to be forward facing in use. This appeals to confirmation bias for those who imagine it too difficult for a right-handed archer to draw arrows from a rear-facing quiver on the left hip. However, this image is suspect. The clothing seems impossibly tight, not only for the fabrics of the day but also compared to the loose-fitting Scythian dress we see in other depictions. He wears Persian headwear, not a Scythian hat and the *gorytos* he is wearing not only appears the wrong shape for the bow he is holding but hanging from a baldric unsecured by a belt, it would flap around most annoyingly. It seems that what we see here is a caricature, a pantomime rendition of an exotic on a souvenir plate. The Scythian quiver system works and it works very well indeed. It is represented hanging rearwards in the vast majority of art depicting Scythians. When made correctly, the Scythian *gorytos* is not reversible (The British Museum, inv. nr. 1837,0609.59)

Among the commonly excavated finds from Scythian and later kurgans are the remains of horse-whips with carved wooden or horn handles, occasionally embellished with precious metal.[8] These are identical to the whips carried by Cossack police in Russia, the same whip which lashed out at the Bolsheviks in 1918 and used against protestors at the Sochi Olympics in 2014. Not only are these whips tools of chastisement but by holding the lash against the base of the handle, they become tools of arrest: wrapped either around the neck or the hands and using the wooden handle to exert leverage, they lend a particular urgency to the phrase 'come along with me sir'. In Athens, Scythians were largely despised and laughed at for their country accents. Aristophanes frequently lampooned them in his plays.[9] It is in this spirit that they are represented by Athenian artists, who made up their idea of what their ancestral archery gear looked like – giving them a bow and arrow because they were called 'archers', not because they actually carried bows.

Arrows

Although iron was also used for Scythian arrowheads, a large number were cast in bronze. Philip of Macedon (r. 359–336 BC) once threatened to enter Scythian lands on the pretext of setting up a bronze statue of Hercules. The Scythian King Ateas announced that if Philip attempted this, then Scythian warriors would seize it and melt the bronze into arrowheads.[10] Scythian

[6] Baughman 2003; Bäbler 2005; Braund 2006.
[7] Herodotus, *The Histories* 4.3.
[8] Simpson and Pankova eds 2017: 132–33, cat. 60 (carved and painted wood, from Pazyryk = State Hermitage Museum, inv. nr. 1684/488); Reeder ed. 1999: 104–105, cat. 3 (carved and stained bone, from kurgan near Zil'ne, Simferopol = Institute of Archaeology, Kiev, inv. nr. AM 658), 117, cat. 14 (wood with gold decoration, from Tolsta Mogila = Museum of Historical Treasures of Ukraine, inv. nr. AZS-2489, 2491/1-18).
[9] Aristophanes, *Thesmophoriazusae* 1002.
[10] Cf. also Herodotus, *The Histories* 4.81, quoted in full by Daragan, this volume.

Figure 8. Replica Scythian arrowhead showing an example with the single barb (author's collection, photograph: Kim Hawkins)

Figure 9. Scythian bronze arrowheads from Arzhan-2, southern Siberia, 7th century BC. Some are tanged and others socketed. Many are trilobate. The horn blunt is most probably for hunting birds or small game. A distinctive feature on a number of surviving Scythian arrowheads is that they have a neat hole in the blade, as can be seen here in the second column, third arrowhead down. It has been suggested that this is a fault in the casting but, in the view of the author, it is more likely that these holes were created deliberately in order to plug the arrowhead with a poisonous paste (The State Hermitage Museum, St. Petersburg, inv. nr. 2917/88/1-8; photograph by Vladimir Terebenin)

Figure 10. Trilobate Scythian arrowheads from Arzhan-2, second half of the 7th century BC. Exquisitely decorated with gold overlaid onto iron and illustrative of the very high status of Scythian military archery (The State Hermitage Museum, St. Petersburg, inv. nrs 2917/24-25; photograph by Vladimir Terebenin)

arrowheads took various forms. Many have a distinctive single barb on one side (Figure 8). A second type, a high proportion of those so far discovered, were trilobate (Figures 9–10). These create what surgeons term a 'star wound', which is more difficult to sew together than two linear flaps of skin. Consequently, there is a greater risk of the victim bleeding out and also the greater the terror at receiving such a wound. In addition, it seems that the blades on these trilobate heads were set with a propeller twist, causing the arrow to spin and thus have greater aerodynamic efficiency.

Scythian arrowheads varied in size but many are very tiny indeed and so would not fit onto a shaft of a size that would stand in a bow of military power. It therefore seems reasonable to assume that they used foreshafts; that is short sections of hardwood, which inserted into the main shaft. An additional advantage of a foreshaft, whether for hunting or for warfare, is that the foreshaft can be sacrificed, whilst the main body of the arrow may be saved for re-use. Regular arrows may break when trying to retrieve them from a victim, especially if embedded with a barbed head.

Figure 11. Fragments of painted arrow shafts from the burial mound at Pazyryk 3, southern Siberia. Late 4th/early 3rd century BC. The shafts are of birch and have been painted. Cinnabar red is dominant because it is a pigment that survives better over time. However, traces of white, black and blue pigment are also evident. The paint may be protective against the elements, it may be decorative and it may indicate personal livery. All these aspects may be true and it may also be a means of identifying arrow type. On some zig-zag and diamond patterns can be discerned like the markings on a snake: perhaps an indication of a poisoned arrow. While some show the nock end, the specimen on the left has a neatly fashioned dowelled end. This is almost certainly a foreshaft. It could be inserted into either a cane shaft or a birch shaft that has been drilled with a corresponding hole (The State Hermitage Museum, St. Petersburg, inv. nr. 1685/31; photograph by Vladimir Terebenin)

Foreshafts also add weight and therefore energy to the strike. The fact that they separate from the main shaft and remain in the body makes them especially useful for delivering poisoned arrows. Foreshafts are most usually associated with cultures using river cane or bamboo arrows. However, it is equally possible to mount a foreshaft into a solid wooden shaft; a hole is drilled to receive a corresponding peg. Archaeological evidence to date suggests that the Scythians made their arrows from birch and that they used a foreshaft system (Figure 11).

Scythicon

The 4th century BC Greek work *'On Marvellous Things Heard'* by pseudo-Aristotle states that:

> 'They say that they make the Scythian poison with which they smear arrows, out of the snake. Apparently the Scythians watch for those that have just borne young, and taking them let them rot for some days. When they think that they are completely decomposed, they pour a man's blood into a small vessel, and dig it into a dunghill, and cover it up. When this has also decomposed they mix the part which stands on the blood, which is watery, with the juice of the snake, and so make a deadly poison.'[11]

In AD 8, the Roman poet Ovid was exiled to Tomis (Constantsa), a town on the Romanian coast of the Black Sea. His vivid description of the locals – the Sarmatian descendants of the Scythians – tell of a fierce horse archer people whose signature weapon was the poisoned arrow:

> 'Great hordes of them and their Sarmatian
> Cousins canter to and fro along the rough roads,

[11] Aristotle, *Minor Works* (Barnes 1995: 1294).

Figure 12. The author's reconstruction of a Scythian saddle under construction. From the funerary evidence the bolsters at the corners are given some rigidity with wooden arches. The pads are stuffed with wool. A felt saddle cloth is tacked to the underside with a few stitches, making the whole thing a single entity (photograph by Kim Hawkins)

Figure 13. The author's reconstruction of a Scythian saddle *in situ*. Note that the two padded panels in the centre are joined by a single layer of leather. This was a significant improvement on a simple pad saddle, which cushioned the seat for the rider but still put weight on the horse's spine. With this design there is the beginnings of a gullet which provides some space over the equine spine. Secured with a single surcingle it is remarkably light and folds in two, making it wonderfully portable, and ideal for a nomad warrior grabbing a horse from the herd (photograph by Kim Hawkins)

> Everyone with bow and quiverful of
> Arrows, yellow-nibbed and vile with venom'.[12]

Ovid's poetic phrasing conjures the psychological dread of poisoned shafts. In his book *Metamorphoses* he refers to the swiftness 'of a Scythian arrow'[13] and in another passage writes how Medea, bent on the destruction of Theseus, 'mixed in a cup a poison which she had brought long ago from the Scythian shores. This poison, they say, comes from the mouth of the Echidnean dog'.[14]

Scythians as horse archers

Although the Scythians are also known as infantry archers, they were first and foremost horse archers and an essential piece of horse archery kit is the saddle. Saddles in remarkable condition have been preserved in the tombs and in order to explore the practicalities of these, the author made a reconstruction based on the information given from the very well recorded reconstruction of the saddle from Pazyryk kurgan 3 which was created under the guidance of Dr Elena Stepanova of the State Hermitage Museum (Figures 12–13). The Scythian saddle is of ingenious design, having four raised bolsters, one at each corner. This suggests the possibility that the Scythians, despite not yet having the stirrup, may have raised themselves in the saddle to shoot. The author found by experience that it is indeed possible to lean into the forward bolsters and raise the rider's seat from the saddle. This has the distinct advantage of isolating the rider from the bounce of the horse and is the foundation of high-performance horse archery. It is certainly possible to sit

[12] Ovid, *Tristia* 5.7.13–16.
[13] Ovid, *Metamorphoses* 10.588.
[14] Ovid, *Metamorphoses* 7.407.

Figure 14. A Scythian horse archer from the 4th–5th century BC. He is shown sitting in the 'chair seat' with bent legs hooked into the bolsters. It may be that this position is how they rode but, in the author's experience, it is extremely difficult and counter-intuitive to do and so may simply be an artist's interpretation of how the equipment is used, perhaps an observation of relaxed riders walking along, pulling their legs up in a resting position, rather than in the fury of battle. It is evidence that cannot be ignored but it must also be set against the dynamic posture that is enabled by the saddle design (The State Hermitage Museum, St. Petersburg, inv. nr. Z-548; photograph by Vladimir Terebenin)

down on the saddle and bounce along whilst shooting. A number of modern horse archers do this. However, the best exponents rise to shoot and I think it is most probable that the Scythians did the same. Certainly, with their saddles, it was possible. Moreover, the design of the Scythian saddle invites this mode. Against this idea are depictions in art which show Scythians sitting on their horses in the so-called chair seat (Figure 14). It is evidence that cannot be ignored but the inferences from art must be set against the dynamic posture that is enabled by the Scythian saddle design. Although the 'legs- up' position of the chair seat can offer a temporarily comfortable change of position when riding without stirrups at a gentle pace, it is an awkward position for the horse archer at full gallop. Given that the bolsters on the Scythian saddle encourage a raised, forward posture when shooting and that this is the optimum position for shooting, it seems most probable that the Scythian saddle developed specifically to facilitate this. It transformed the abilities of the horse archer and was arguably a more significant development in horse equipment that that of the stirrup many centuries later.

Scythian legacy: the Parthians

The Scythians spread their influence, and briefly their presence, into Iran. They left behind a martial legacy, particularly that of the horse archer, which was reflected in the indigenous Parthian culture from the 3rd century BC onwards and, in particular, the type of saddle which was used by the Parthians was a four-horn saddle without stirrups. It owed much to the Scythian saddle and was subsequently adopted by the cavalry of Rome (Figures 15–16).

Figure 15. Replica of four-horn Parthian style saddle: the derivation from the Scythian saddle is clear with the bolsters evolving into pronounced and sturdy horns (photograph by Kim Hawkins)

Figure 16. The author shooting from a Parthian style saddle. Note that there are no stirrups. Nevertheless, the forward horns enable the rider to lean forward and so elevate his seat from the bounce of the horse's motion at the moment of shooting. It is a stable position and the knees may be used as shock-absorbers in the same way that they are when riding with stirrups. It requires a level of riding fitness that the 'stirruped' saddle does not, but to young Parthian warriors that was no detriment. The rear horns prevent the rider from slipping backwards in the saddle and would also enable him to sit into an impact from a lance (photograph by Kim Hawkins)

A priestly burial from the Taksai-1 cemetery

Yana Lukpanova[1]

Abstract

This paper presents finds excavated in kurgan 6 in the Taksai-1 cemetery, which was investigated by an expedition of the West Kazakhstan History and Archaeology Regional Centre in 2012. The central burial belonged to a woman of elevated social position, and the existence of solar symbols on her clothing, a distinctive headdress, long gold pendants by her temples, bracelets with 'Animal Style' scenes, the accompanying burial ceremony and the massive funeral construction demonstrate her special status. The ritual objects carefully placed in one corner of this grave and the presence of symbols expressed in 'Animal Style' lead us to propose that this person was a priestess.

Keywords: Taksai-1; kurgan; design; 'Animal Style'; priestess; bridle; world view; ritual; symbol; mortar and pestle

Introduction

The Taksai-1 cemetery is located in the middle Ural river basin, 8 km from Dolinnoe village in the Terekti district of western Kazakhstan and some 50 km east of the city of Uralsk, close to the border with Russia. It consisted of six earth burial mounds, of which kurgan 6 lay on the eastern edge. It was excavated in 2012 and proved to be a unique burial belonging to a woman from a high level of early nomadic society.[2] The present height of this mound was only a metre as it had been heavily ploughed but it measured as much as 41 m across (Figure 1). The mound covered a central pit containing a log-house built of narrow logs. This structure was set on fire during the burial and therefore was carbonised. The log-house was surrounded by two circular banks of yellow clay and adobe blocks which were burnt to a red colour (Figure 2). The beheaded remains of two women were found placed on the ancient ground-surface in the northwest and southeast areas of the mound. The age of the woman from the northwest burial was about 45–55 years at death, whereas the second was 35–45 years of age.[3]

The pit was rectilinear and covered with a double layer of poplar logs. In the centre there was a wooden post which originally supported this flat roof in the manner of a tent pole. The diameter of the logs was 0.20–0.25 m. The pit was 3.5 m deep below datum and measured 5.7 x 5.4 m across at the bottom. Four sets of horse bridles were found next to the western and southern walls of the pit (Figure 3). These consisted of iron horse-bits, *psalia*, beads, headstalls and bronze rein distributors. The elements of horse equipment were made in 'Animal Style', and dominated by images of birds of prey or the beak and claws of an eagle-headed predator.[4] The lower central part of the southern wall of the pit was faced with a semi-circular panel in the centre, framed by thin diagonal slanting wooden beams. Lying along the foot of this were fragments of gold clothing appliqué plaques, a pendant and a wolf fang in a gold setting,[5] and the skeletal remains of different species of animals (Figure 4). The western wall of the pit was also decorated with thin blocks, also with animal bones lying along the foot.

The finds within the tomb pit varied between the eastern and western parts (Figure 5). Close to the eastern wall lay the remains of a third individual whose body had been placed on a mat. Her age at death was about 25 years and she was only 1.50 m tall, but unfortunately her remains were in poor condition owing to the high temperature the structure endured during its destruction (Figure 6). However, the associated finds proved that she had been wearing clothing richly decorated with gold, including sewn-on appliqué plaques, beads and the remains of a headdress. Some objects remained *in situ* but as a result of the decay of the log construction her body had become displaced. This clothing evidently had been worn in daily life as there are traces of ancient repair on some plaques, as well as signs of wear on the jewellery arising from regular use (Figures 7–8).[6]

The woman was buried wearing a tall conical headdress decorated with a stylised representation of

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[2] Sdykov and Lukpanova 2013.

[3] These estimates were made by Maria V. Dobrovolskaya, Department of Theory and Technique, Institute of Archaeology of the Russian Academy of Sciences, Moscow.

[4] Lukpanova 2014*a*.

[5] Identified by Lilia Javorskaja.

[6] Altynbekov 2013; Lukpanova 2014*b*.

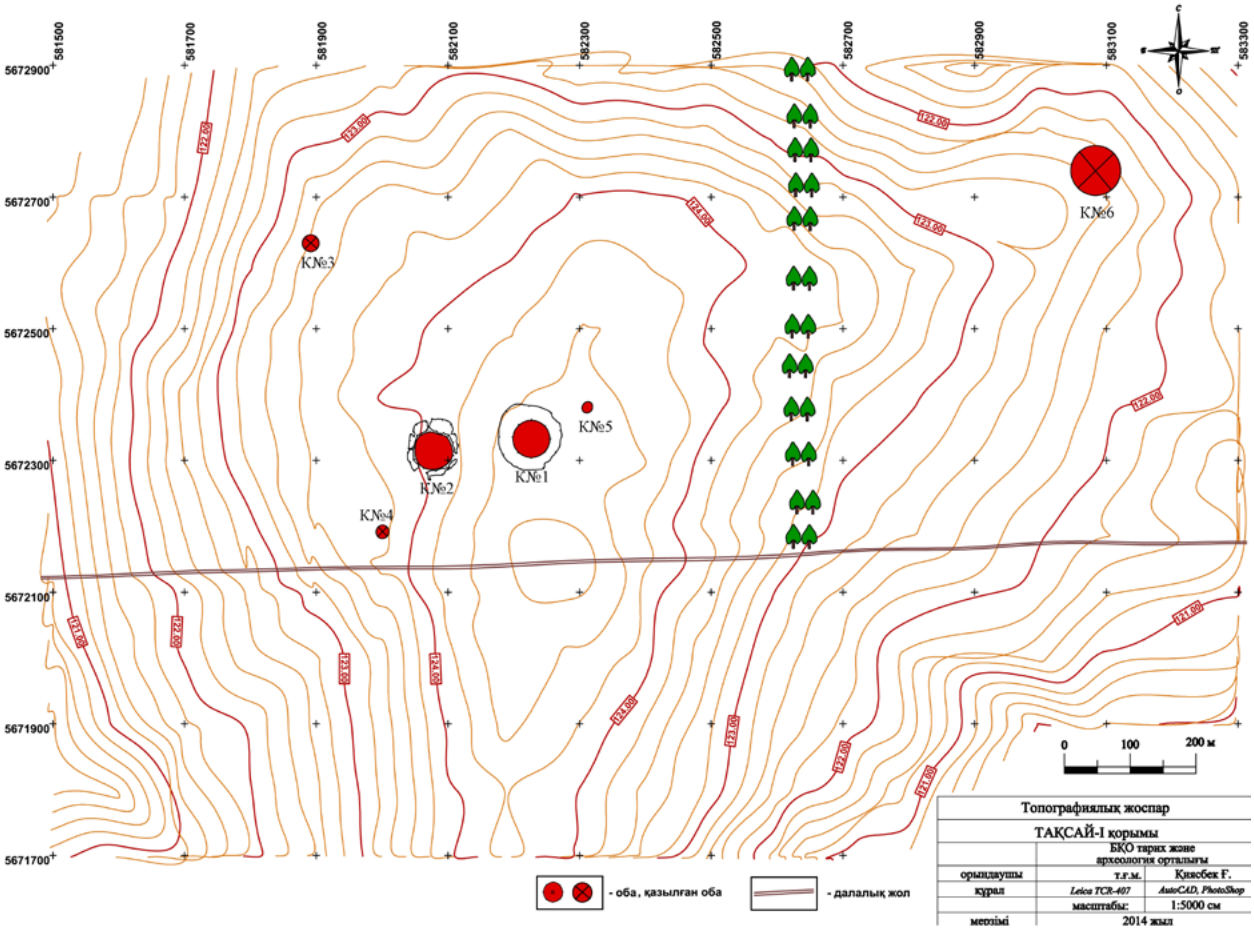

Figure 1. Plan of the cemetery complex at Taksai-1

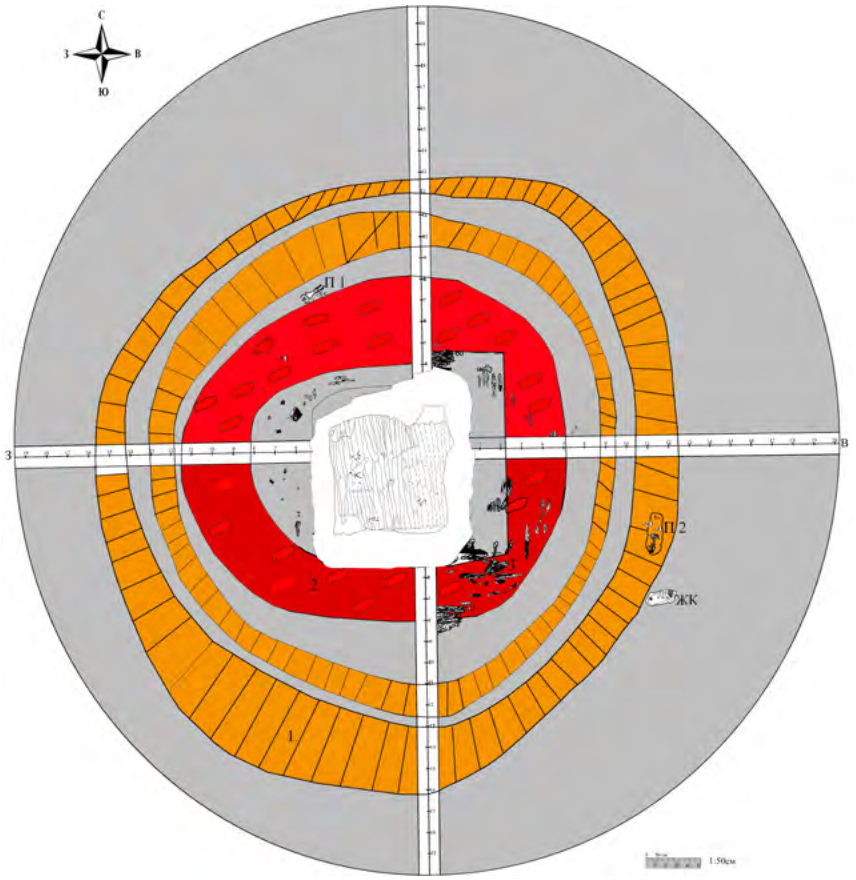

Figure 2. Plan of kurgan 6 after excavation

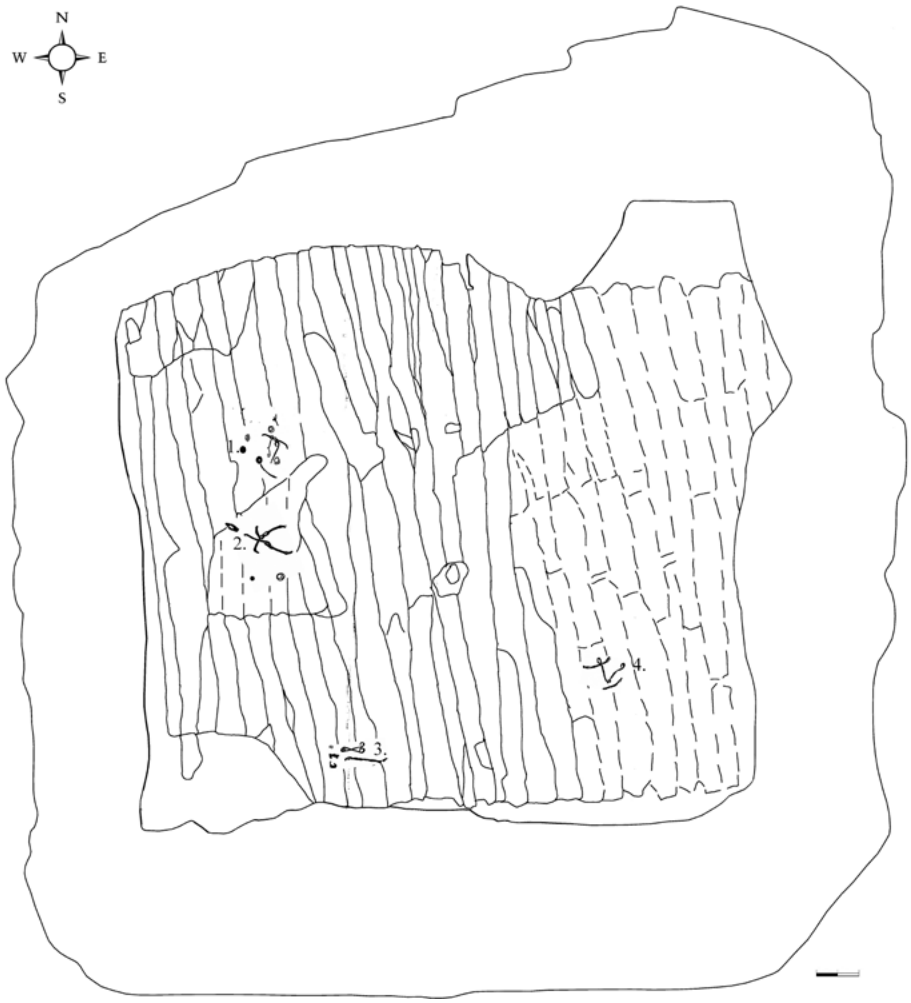

Figure 3. Log roof of the central tomb with horse bridles *in situ*

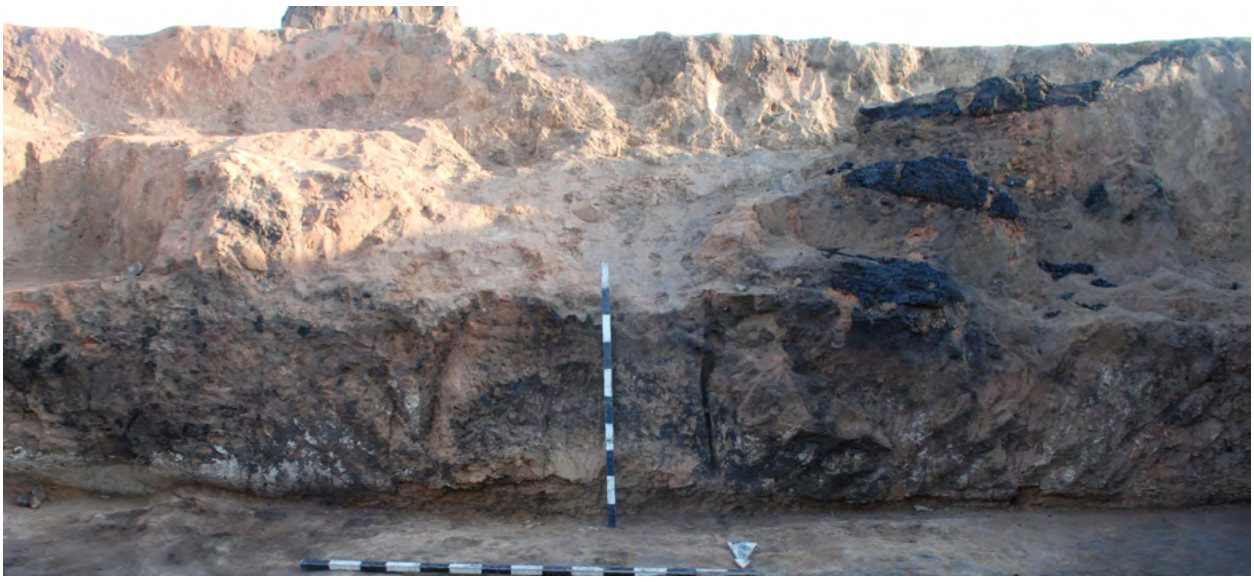

Figure 4. The southern wall of the tomb pit

a mountain goat (Figure 9): the peak of the headdress represents the protome of the goat whereas the schematically represented legs extended down the sides of the headdress to hold the sides rigid and terminated in stylised hooves. The famous archaeologist K.A. Akishev considered that peaked caps like this were worn 'by representatives of all other Saka tribes and even European Scythians'.[7] To

[7] Akishev 1978: 44.

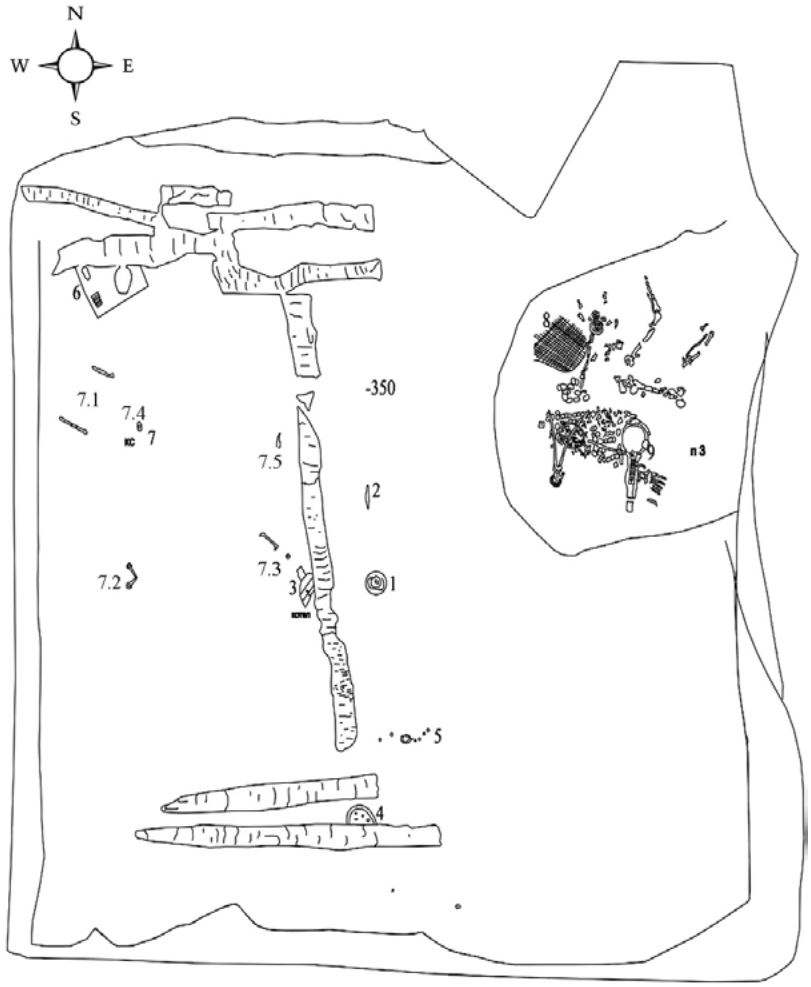

Figure 5. Plan of the main distribution of finds within the tomb pit

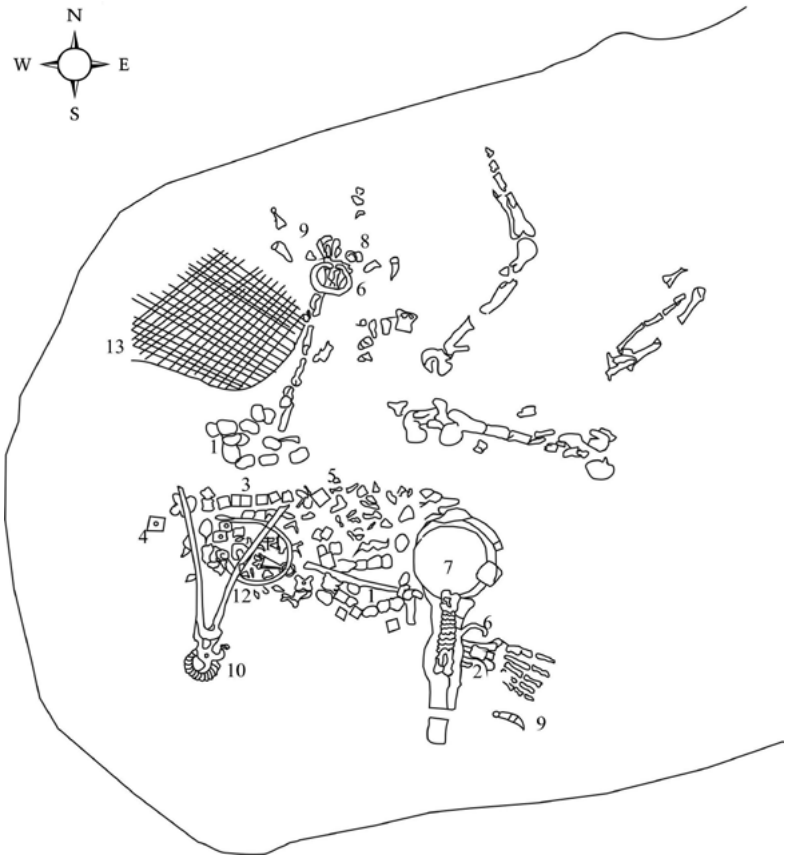

Figure 6. Plan of the finds associated with burial 3

Figure 7. Physical reconstruction of the appearance of lady in burial 3 (photograph: Krym Altynbekov)

Figure 8. Drawn reconstruction of the appearance of the lady in burial 3 (drawing by the author)

the left of her head, at the level of the bottom of her headdress, were six small swastika plaques which had originally probably been sewn in pairs around its lower portion. Judging by the position of other appliqués found *in situ*, we may reconstruct her clothing as a dress with long wide sleeves and a short caftan with short bell-shaped sleeves ending just above the elbows. Square plaques with images of two opposing rams' heads were sewn onto her dress (Figure 10). Amuletic pendants made of wolf fangs mounted in gold were suspended from the edges of her sleeves. S.A. Yatsenko notes that on womens' dress they were placed in three locations: the headdress, edges of the sleeves of the dress and the tips of the shoes, and he emphasises that 'the lower part of sleeves of clothes was decorated with cross rows of plaques and beads, leather belts with the strung beads'.[8] This argument does not exclude the possibility of amuletic pendants being suspended from the lower part of the sleeves, and pendants originally attached to the sleeves of a dress of a woman found in the Strashnaya Mogila burial mound offer such an example.[9] We may also consider K. Altynbekov's version that they were a component of amuletic bracelets worn on the wrist.[10] The overlapping caftan or loose clothes was worn over a dress and sewn onto the sleeves were oval gold plaques showing two antithetical rams' heads, with 13 on each sleeve

[8] Yatsenko 2006: 83.
[9] Yatsenko 2006: 42.
[10] Altynbekov 2013: 44.

Figure 9. The frame of the headdress, H 53 cm, wgt 325 g (National Museum of the Republic of Kazakhstan, Astana, inv. nr. ТК2-913) (drawing by Diyarov Timur)

(Figure 11). The reconstructed diameter of a sleeve was 25 cm. The second type of plaque served as a basic decorative element of the caftan was represented by square appliqué plaques with each arm represented by the head of a griffin-seen in profile, and placed one after the other in a swastika arrangement. The plaques were originally sewn onto the shoulders, sleeves, front and back of the outer garment: they were identical in terms of manufacturing technique and measured 4 x 4 cm and 2.5 x 2.5 cm square (Figure 12). The back and hem of the caftan were decorated with hollow biconical gold beads (Figure 13). Each of these was made in two conical halves soldered together with pairs of twisted gold strips inserted into regular vertical hollows. Finally, the woman's dress was supplemented by jewellery and ritual objects: these objects were placed physically near her and were an integral part of her appearance (Figure 14). They consisted of a pair of heavy gold pendants found next to her temples (Figure 15);[11] around her neck was a cast gold torc, and on her wrists were a pair of omega-shaped gold bracelets, the terminals of which were decorated with scenes of a horned feline predator attacking a herbivore.[12]

Other objects were also placed next to this individual as part of the funerary ceremony. A double-sided bronze disc mirror in a walnut case was found next to

Figure 10. Gold plaques with representations of rams, H 2.5 cm, wgt 34 g (National Museum of the Republic of Kazakhstan, Astana, inv. nr. ТК2-925/1-7)

[11] Sdykov and Lukpanova 2013: 192–202; Simpson and Pankova eds 2017: 137, cat. 67.

[12] Sdykov and Lukpanova 2013: 182–87; Simpson and Pankova eds 2017: 303, cat. 218; see also Satubaldin *et al.* and Shablavina, this volume.

Figure 11. Gold plaques depicting the heads of mountain goats, H 4.5 x 3 cm, wgt 254 g (National Museum of the Republic of Kazakhstan, Astana, inv. nr. тк2-924/1-26)

Figure 12. Gold plaques with rotating griffin-heads in a swastika composition, H 4 x 4 cm, wgt 212 g (National Museum of the Republic of Kazakhstan, Astana, inv. nr. тк2-926/1-16)

Figure 13. Biconical gold clothing beads, H 2 cm, wgt 47 g (National Museum of the Republic of Kazakhstan, Astana, inv. nrs тк2-915/1-8, тк2-932, тк2-933, тк2-934)

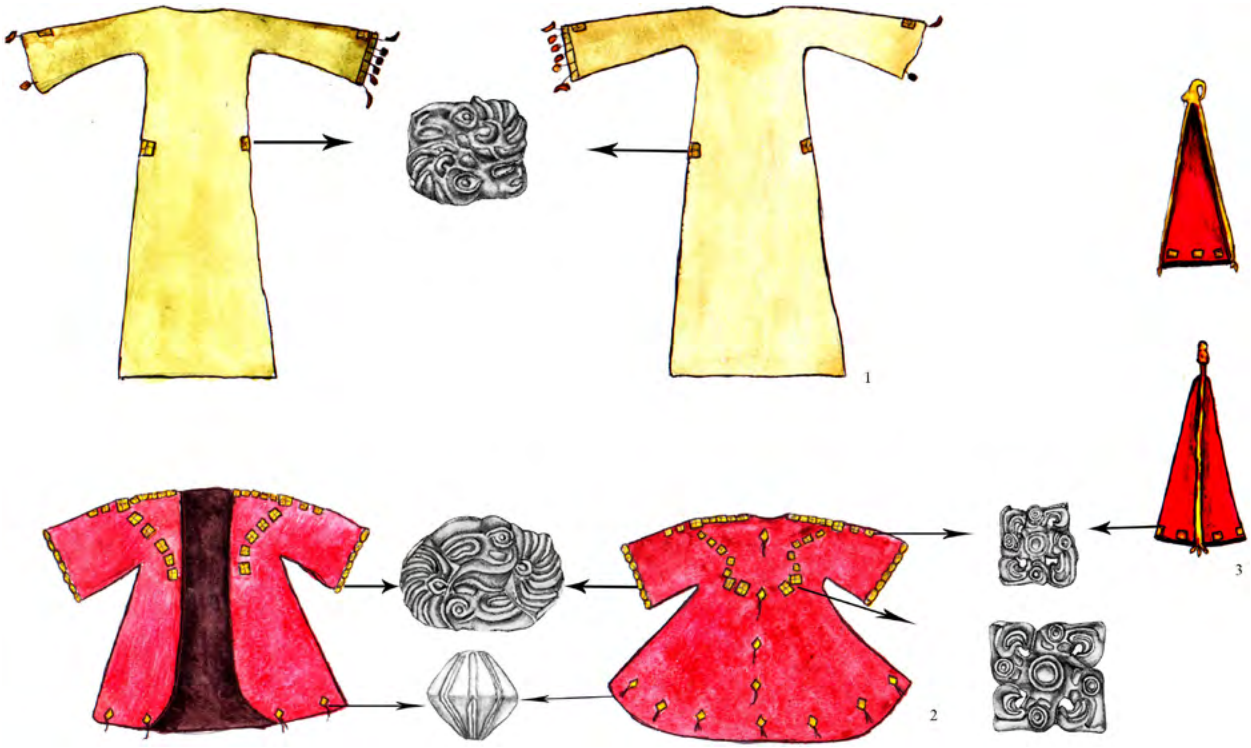

Figure 14. Drawn reconstruction of the clothing indicating the original position of the decorative elements (drawing by the author)

Figure 15. Gold pendant earrings: 1, H 11 cm, wgt 89 g; 2, H 21 cm, wgt 110 g (National Museum of the Republic of Kazakhstan, Astana, inv. nrs тк2-928, тк2-929)

her right hand (Figure 16).[13] The handle of this mirror was covered with gold overlay attached with a pair of rivets; the upper and lower parts each took the form of a stylised griffins' head, but mirrored and recalling the rotating composition concept of the griffins' heads on the swastika appliqué plaques mentioned above.

This type of mirror is typical of the Ural piedmont region during the 6th–5th centuries BC, and similar mirrors were found at the Lebedevka complex.[14] Near the left hand of the woman in our burial was a tiny core-formed dark blue glass cosmetic vessel decorated with concentric and zigzag coloured trails on the body and a twisted coil around the rim.[15]

Next to the central pillar in this tomb was a fragmentary wooden bowl with six gold overlays originally attached to the rim. These overlays were made of sheet gold and took the form of birds' beaks and animal hooves: direct analogy to these was found in kurgan 9 in group 6 at Pyatimara-1,[16] and others were found in the kurgans at Filippovka-1.[17] Several authors assume that similar vessels with gold overlays were used for sacred drinks.[18]

In the eastern part of the tomb pit a polychrome glass cup was found, with seven beads placed around it: one

[13] The wood identification was made by Dr Maria Kolosova, Department of Scientific and Technological Expertise, State Hermitage Museum.

[14] Gutsalov 2007: 75, fig. 3.1.
[15] Treister 2013*c*.
[16] Smirnov 1964: 218, 371, fig. 80.12.
[17] Korolkova 2003; Kamaleev 2018: 134–213, cats 213–595.
[18] Fedorov 1997: 71; Akishev 1984*a*: 94; Korolkova 2003: 56.

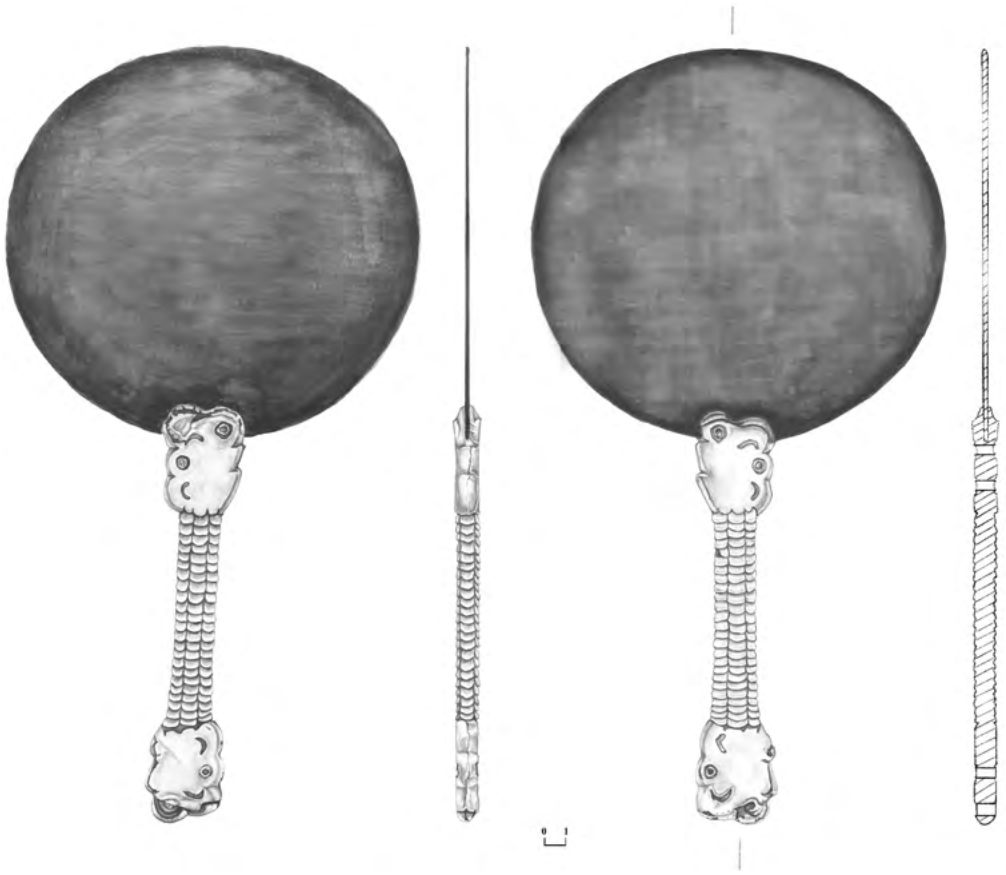

Figure 16. Bronze mirror with gold overlay, L 34.6 cm (National Museum of the Republic of Kazakhstan, Astana, inv. nr. тк2-942) (drawing by Diyarov Timur)

white, four blue 'eye' beads and two yellow 'eye' beads. To the north of the central column an iron knife was placed with the blade facing south. In the western part of the pit a group of ritual objects were found which presumably belonged to the woman. Near the central column was a hemispherical bronze cauldron with incurving walls (Figure 17). Attached to opposite sides of the rim were a pair of vertical looped handles, each with three protruding knobs on the top, and two more plain looped handles were attached to the body directly below. Between the handles there was a spout in the form of a Bactrian camel's head with a rearing neck, bared teeth, bulging eyes and circular ears either side of an upright tuft representing its dense mane. This cauldron must have been used for ritual purposes, and the image of a fearsome camel on the spout underlined its ceremonial importance and the person who used it was probably afforded special authority.

Near the cauldron was another bridle (bridle 5), consisting of an iron horse bit and two *psalia*, circular discs with a massive soldered loop on the back, and headstalls in the form of extended beaks representing a bird of prey. This was one of five horse bridles found in this burial mound:[19] all date to the 6th or beginning

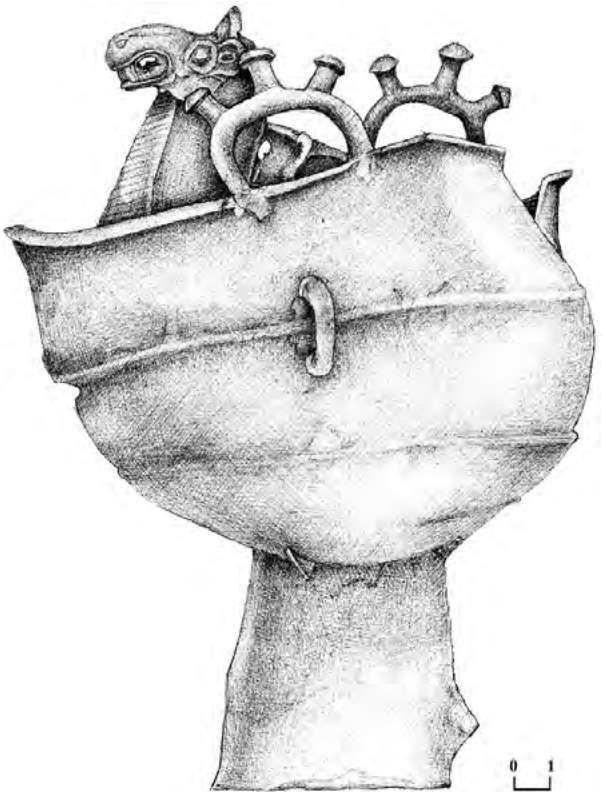

Figure 17. Bronze cauldron, H 20 cm (Museum of Local History, Uralsk, inv. nr. 9326/9 ВКОМ) (drawing by Diyarov Timur)

[19] Lukpanova 2014*a*: 149–60.

Figure 18. Bronze brazier, H 10.5, D 20.5 x 15 cm (Museum of Local History, Uralsk, inv. nr. 9326/8 BKOM)

of the 5th centuries BC and are characteristic of the southern Ural piedmont. This set presumably had been used in everyday life, hence it had been added to the personal items of the deceased person.[20] Separate elements of a bridle were found in the pit fill. An oval hemispherical perforated bronze brazier was found closer to the west wall: such items were a characteristic item of households and religious cults alike (Figure 18).

A walnut-wood box (*Juglans* sp.) was found in the northwest corner of the tomb pit. It measured 50 x 80 cm across and was made of five flat boards with a low side. It contained objects of a specific ritual function which are typical of priestly ceremonies: the paw pads of two wolves, a knife with a bone handle, a horse bridle ornament in the form of the head of a bird of prey, and a unique carved wooden comb with an openwork representation of combat between a Scythian and Persians in a chariot (Figure 19).[21] Placed with the comb were a small white alabaster vessel, a mortar and pestle, a pebble, and wolf fangs, one perforated for suspension.

The bridle ornament represented a small flat object with a round cruciform opening, and had been made to represent the stylised head of a bird of prey. Similar items are found as single items in burial mounds in the Besoba region: barrow 4,[22] Pyatimary barrow 4,[23] Mechet-sai barrow 2;[24] moreover, ten others have been reported from the Altai region and the neighbouring part of eastern Kazakhstan. P.I. Shulga notes that such items are rare and are small with an internal diameter of 0.7 cm.[25]

The decoration of the woman's clothing was in 'Animal Style' which reflected the world view and spiritual ideology of early nomads, not just in the southern Ural piedmont, but across the entire Eurasian steppe. The solar symbols on her clothing emphasise the status and position of the interred woman. Along with practical and aesthetic considerations, they played a magical/religious role and indication of high status, they served as particular symbols as each was encoded with social information. There are six types of animal representation in this grave assemblage. The Taksai-1 zoomorphic repertoire is expressed by specific or fantastic animals and their images help reconstruct ideological and religious views of early nomads. The conical headdress is a symbolic 'tree of life' and mountain top.

Early nomads conceived their world order as divided into three zones with the 'middle world' connected with hooved animals,[26] while at the same time the existence of an animal image on the finials of any subject 'sacralized the imperial power, a high social status'.[27] It is important to note that items topped with images or beings connected with the 'upper world' or hooved animals which could be also a 'tree of life' in general. The image of a predator was not established on the finials,[28] so the predators personify a death force belonging to the underworld, the 'lower world' of death and darkness. In such a classification of animals, the representation of a goat is a particularly important ritual beast. B.A. Litvinsky considered that the Iranian-speaking peoples had a cult of the goat and he connected this with a cult of mountains, a cycle of 'tree' and fertility.[29] Perhaps, this sense was expressed in the structure of this headdress. Ibexes and rams were sometimes represented as two identical images, the ram had 'solar and fiery structure, was the figure of a *hvarna*'. [30] Among the representations on the objects from this burial mound, the image of a griffin and eagle-headed predator predominate, and there are over 200 of them here: on appliqué plaques, the mirror, vessels and bridle elements. The griffin, along with other images, represented the 'upper world' of the heavens. A bird is a universal symbol of sky and the sun.[31] An eagle is the king of

[20] Ochir-Goryaeva and Dvornichenko 2006: 240.
[21] See Summerer and Lukpanova, this volume.
[22] Kadyrbayev 1984: fig. 1.5.
[23] Smirnov 1964: fig. 21.1.
[24] Smirnov 1961: fig. 55.8.
[25] Shulga 2008: 89.
[26] Perevodchikova 1994: 11.
[27] Sinika 2004: 141.
[28] Perevodchikova 1994: 17.
[29] Litvinsky 1972: 145.
[30] Akishev 1984*a*: 37–38.
[31] Akishev 1984*a*: 40.

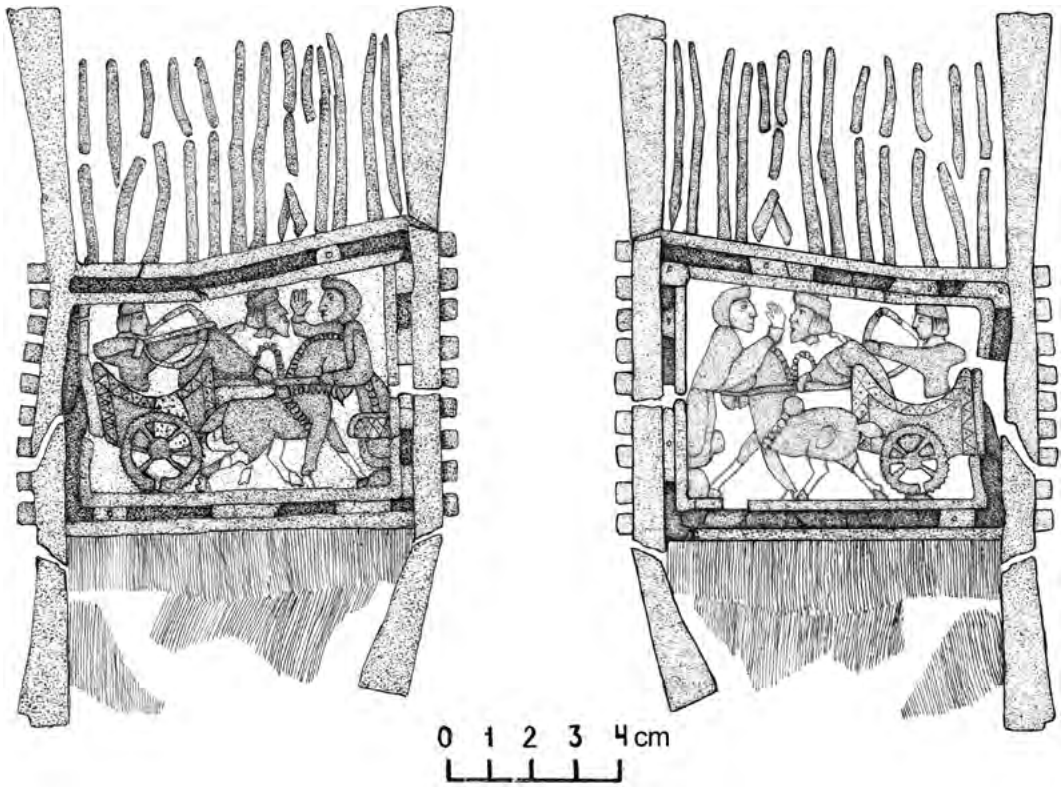

Figure 19. Poplar-wood comb, W 10.6, H 15.8 cm (Museum of Local History, Uralsk, inv. nr. 28601BKOM) (drawing by Diyarov Timur)

birds, endowed with fantastic strength, symbolising the astral world and acting as an embodiment of good and evil.[32] The cult of the sun is foremost in the world view of early nomads, and was one of ideological expressions of space and the vital beginning. Solar symbols were represented as plaques, solar deer and altars.[33] Having the swastika form they took on a sacral magical character.[34] The swastika is an ancient Aryan symbol of the unification of heavenly forces of fire and wind with an altar – the place of fusion of heavenly and terrestrial forces. That is why Aryan altars were decorated with a swastika and thought to be sacrally protected from evil. In Indian mythology the swastika was traditionally interpreted as a solar symbol, the sign of light and generosity, the Vishnu.[35] We consider that the significance of this sign also extended to the nomads of the Iron Age of the southern Ural piedmont. The image of the bird represented on the appliqué plaques from Taksai-1 is a heraldic sign emphasising the status of the person, and we consider that the code of this symbol was also constant among these early nomads of the southern Ural piedmont. The dress was always allocated with special sense, holding social, sacred and aesthetic functions, allowing individuals to be distinguished by gender, status, territory and religious affiliation. The dress served as an important cultural source offering information on cultural connections and perceptions of the world around.

The predation scene on the bracelets involves a fantastic predator and herbivore (Figure 20). The former belongs to the chthonic zone of Eurasian nomad world view and combine elements of predatory animals, hooved animals and birds, and this fusion place them in a spirit world. The ideas of early nomads of their surrounding world generated unrealistic images of animals by combining features of different species but 'in all their variety, these combinations were rather rigid; only strictly certain combinations of signs of different animals were allowed'.[36] The meaning behind predation scenes was explained by three concepts of interpretation of 'Animal Style'.[37] Ancient people believed that each death led to a new birth, an ideology familiar to all people in traditional ceremonies of initiation. At the same time, it was a sacrifice, the birth of something new, and a manifestation of dualism as a conflict of natural opposites. In a predation scene the totemistic, magical and mythological aspect was emphasised. It is very interesting that E.E. Kuzmina considered Scythian-Saka predation scenes to be 'an ideological symbol – spring revival and royal power'.[38]

[32] Rempel 1977: 31.
[33] Martynov 1984: 5.
[34] Smirnov 1964: 139.
[35] Meletinsky ed. 1990: 481.
[36] Perevodchikova 1994: 48.
[37] Korolkova 2006: 129.
[38] Kuzmina 1987: 9.

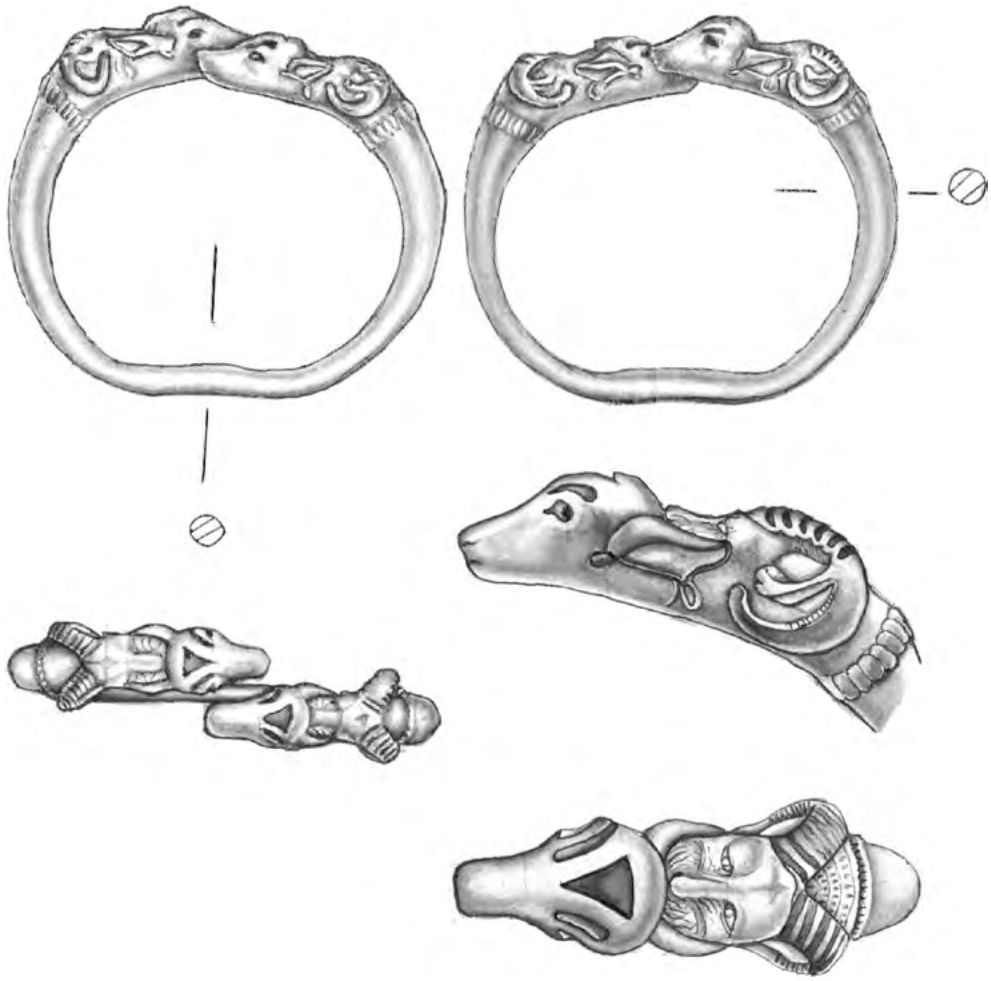

Figure 20. Gold bracelets: 1, D 7.9 x 6.5 cm, wgt 182 g; 2, D 6.5 cm, wgt 182 g (National Museum of the Republic of Kazakhstan, Astana, inv. nrs тк2-930, 2-931) (drawing by Diyarov Timur)

The camel is presented by a single image, that on the bronze cauldron. There are not many spouts of this type in 'Animal Style' art but we do find them in the art of early nomads. Thus, for example, a small vessel in the form of a cauldron from the Alichur-II complex, in the Pamirs, also has a bird's head, and a chance find from the Donetsk region has a spout in the form of a bull's head.[39] L.I. Rempel identifies the image of a two-humped camel as a god, and extols it as a heraldic sign.[40] The representation of a camel to Iranians was a sign of *khwarna*, 'royal power',[41] and the embodiment of a solar god.[42] L.I. Rempel provides several examples of images of winged camels, thus grouping them with griffins and winged horses. We may agree with this assumption as the camel was not considered a simple herbivore: ancient nomads instead placed it on a par with predators and horses. There are other ritual objects where the camel takes the central place in the composition of an object,[43] and is given the role of a deity. The image of a camel with bared teeth has been found on distributive objects, among the zoomorphic images of Kyryk-oba II.[44]

Our burial belonged to a woman of high social status in society, and the existence of solar symbols on her clothing, her distinctive headdress, elaborate pendant earrings, bracelets with 'Animal Style' contest scenes and other jewellery, all demonstrate her special status. Analysing the entire grave assemblage, we may suppose that this burial represents that of a priestess. In addition to the gold jewellery, there was the richly decorated bronze mirror, amulets, a fumigation brazier, ritual items inside the walnut-wood box, fang amulets, a pair of wolf paws, a unique carved wooden comb, and a pestle and mortar, all indispensable attributes of Sarmatian priestesses. Many dress accessories were closely connected with religious beliefs and the gold plaques executed in 'Animal Style' added magical value. Judging by the ceremony and the existence of significant objects in burial, the woman buried in the centre of this tomb performed priestly functions.

[39] Demidenko 2008: 229.
[40] Rempel 1977: 31.
[41] Akishev 1984*a*: 73–74.
[42] Akishev 1976: 194.
[43] Akishev 1984*a*: 69–70.
[44] Lukpanova 2008: 247.

Finally, we should note that the distributor-tee found in barrow 6 may have served as a rein separator, as shown on late Assyrian palace reliefs.[45] Considering the presence of four bridle sets on the roof of the tomb, we find it possible that these early nomads conceived of funerary chariots when they constructed the funeral chamber, and the depiction on the comb presented in a separate paper by the author and L. Summerer suggests that such vehicles were indeed known in this region.[46] The influence of the Near East cannot be excluded where the chariot also played an important ideological role. Being a weapon of war of the upper classes with a powerful impact on those opposing it, the chariot became sacralised. It also served for ceremonial journeys by governors, in hunting and accompanying them in their 'afterlife'. It is an obvious fact that this archaeological monument is the burial of a member of the social elite of early nomadic society at the beginning of the 5th century BC.

[45] Shulga 2008: 48.
[46] Sdykov and Lukpanova 2013: 144.

The Okunev culture: a unique Siberian civilisation and its links with Scythian and later cultures

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Abstract

For a long time archaeologists believed that the sources of the Scythian 'Animal Style' should be sought in the Near East, Greece or China but archaeological materials discovered over the past 50 years allow us to identify another Bronze Age centre in central Asia which strongly influenced later cultures of Siberia and the formation of the Scythian 'Animal Style'. The sources of certain ways of depicting animals which are characteristic of this style and the 'Cimmerian' 'rhombus in a circle' symbol instead should be sought on the stone statues of the Bronze Age Okunev culture. Two or three symbolic lines appear on the obverse sides of Okunev stone statues, 'deer' stones and Tashtyk plaster masks. The cultural influence of the Okunev people and their pictorial style on subsequent Eurasian cultures was diverse and significant.

Keywords: Siberia; Okunev culture; Arzhan; Pazyryk; Scythians; art; tattoos; 'Animal Style'; megaliths

Introduction

The Okunev culture was one of the most outstanding cattle-breeding Bronze Age cultures of Eurasia and is radiocarbon dated from the mid-3rd to the beginning of the 2nd millennia BC.[2] It was a centre of an ancient civilisation which formed in the Minusinsk basin in the modern Republic of Khakassia of Russia and the northern part of the Sayan-Altai plateau, yet the extraordinary materials of this culture are little-known beyond a narrow circle of Siberian archaeologists and are virtually unknown outside Russia (Figures 1–2). The culture gets its name from the district of Okunev Ulus in the south of Khakassia. Sergey Teploukhov first excavated a number of graves there in 1928, but it was only in the 1960s that Gleb Maximenkov identified it as an archaeological culture in its own right.[3] The anthropological type of the population at that time was morphologically diverse, consisting of both native mongoloids and newly-arrived Europeoids,[4] and archaeologists have proposed a number of alternatives for the ancestral home of the Okunev people including the steppe regions of eastern Europe, Kazakhstan, western and central Asia, Mongolia, China, Tibet and even India.[5]

The main occupation of the Okunev people was cattle-breeding: cattle and sheep were their predominant farm animals. When they moved from place to place with their herds they used two- or four-wheeled carts drawn by oxen, judging by depictions on statues and rocks.[6] An important part of their activity was hunting wild animals and fishing. On the steppe and in the taiga they hunted bear, elk, deer, roe deer, musk-deer, wolf, lynx, sable, marmot, otter, beaver, boar and a variety of birds.[7] They made amulets and items of personal adornment for clothing and footwear from the teeth, horns and small bones of these animals. The bones of oxen, horses, sheep and deer (and their teeth), a demoiselle crane, bear fangs and a lynx's skull found in burials and cult places are evidence of the complex attributes of cattle-breeding and hunting mysteries in the Okunev period.[8] Of particular interest is a small figurine of a bear carved from bone and shown with a wide open mouth, circular eye, a small pointed ear and short legs, its hair is rendered by deep points and it has a circular hole on its back for suspension (Figure 2.4).[9] In comparison with the previous Afanasevo culture,[10] the Okunev people had a much higher standard of metallurgy and metalwork. They knew not only copper but also bronze which they cast and forged to make knives, spears, daggers, axes, needles, hooks, adornments and other items. They used clay to make flat-bottomed vessels and ritual incense-burners ornamented with a cogged stamp or stick with which they applied checquer, zigzag and hollow designs (Figure 1.15–16).

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[2] Maximenkov 1980; Svyatko *et al.* 2009: 247–50; Lazaretov *et al.* 2012: 134.

[3] Maximenkov 1980.

[4] Gromov 1997.

[5] Leontiev, Kapelko and Esin 2006: 78; Lazaretov *et al.* 2012.

[6] Leontiev, Kapelko and Esin 2006: 136, 176.

[7] Vadetskaya, Leontiev and Maximenkov 1980: 31–33.

[8] Vadetskaya, Leontiev and Maximenkov 1980: 24.

[9] Komarova 1981: 82; fig. 6.5.

[10] Vadetskaya, Polyakov and Stepanova 2014.

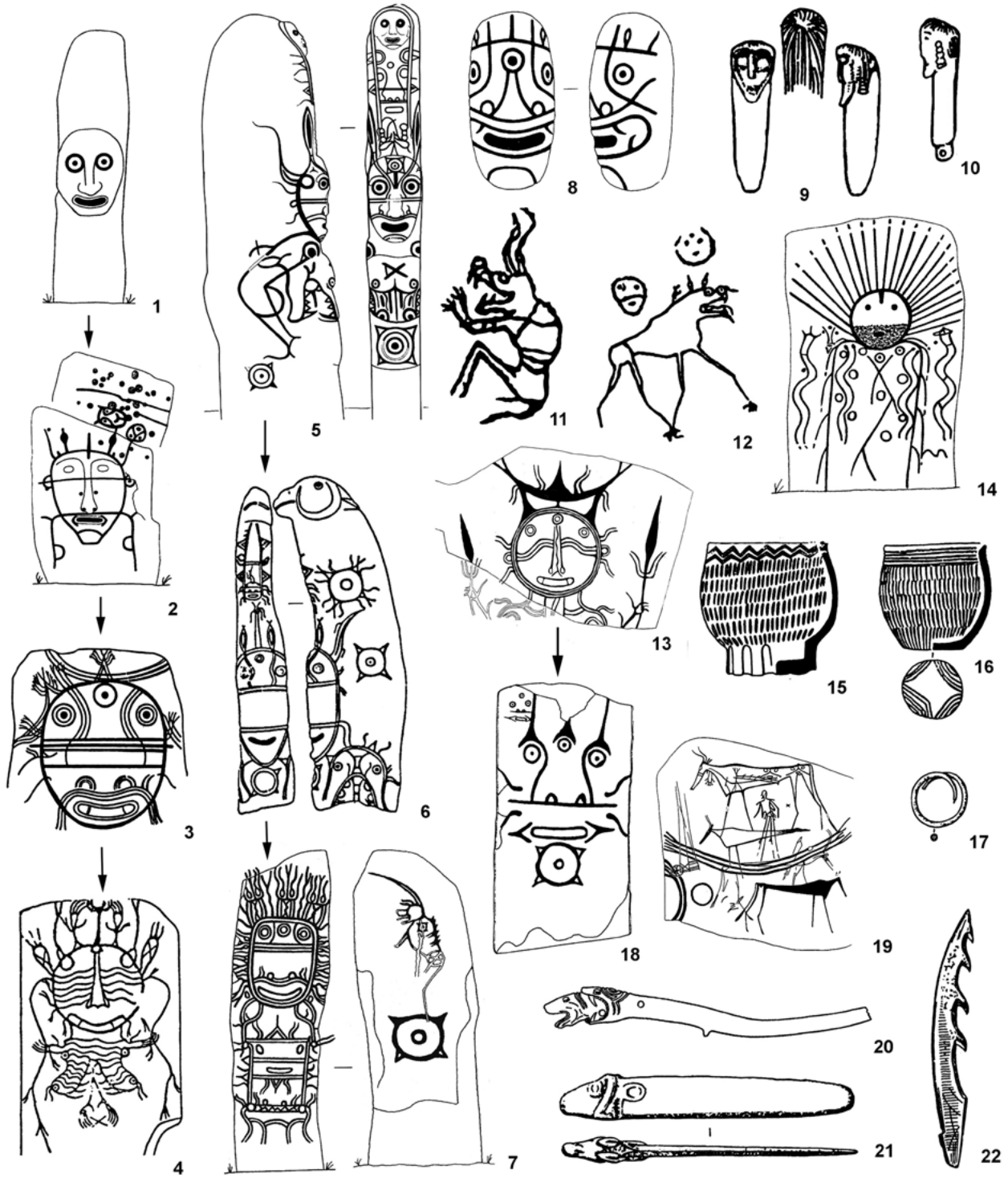

Figure 1. Depictions and artefacts of Okunev culture in Khakassia: 1–8, 11–14, 18–19, stone statues and slabs; 9–10, 21, anthropomorphic and zoomorphic rod-amulets; 15-16, vessels; 17, temporal ring; 20, cult staff; 22, harpoon (see Table 1)[11]

During the 3rd millennium BC incoming groups of cattle-breeders and the local hunting population formed new cultural traditions in which sacral rituals and depictions were of great importance. The sacral 'art' of Okunev culture includes monumental stone statues, stelae and slabs, petroglyphs and colourful drawings on rocks, and small objects of horn, bone, stone and metal featuring real and 'fantastic' zoomorphic and anthropomorphic depictions (Figure 1).[12] The original pictorial art of the Okunev people stands out sharply among the Bronze Age cultures of Siberia and neighbouring regions.

[11] For information on the depictions in Figs 1, 5-7 see Tables 1–4.

[12] Vadetskaya, Leontiev and Maximenkov 1980; Leontiev, Kapelko and Esin 2006.

The schematically simple and anthropomorphic solar faces, depictions of 'fat' and 'lean' oxen and cows, carts, women in childbirth, snakes, complex multi-figured zoomorphic and anthropomorphic compositions on large stone statues and slabs, and similar images on small stone objects, plates of stone and horn only briefly characterise the system of beliefs of the Okunev tribes (Figures 1–2). The representations on Okunev statues and slabs gradually evolved over time from simple designs to more complex sacral or mythological depictions (Figure 1.1–7).

A sandstone slab from Chernovaya-VIII features the contour of a face with three concentric circles, presumably depicting eyes (Figure 1.13). The nose emerges from the central eye and in the middle of the nose is a snake-like line ending with a bifurcation. The elongated oval mouth is divided into three unequal parts: a large central element and two smaller ones at the corners. Three wavy lines run across the face from the nose. The ears are represented by two concentric semi-circles; above and below the ears are two wavy offshoots. On the head is a 'crown' with three offshoots and this depiction also includes the neck, shoulders and part of the left hand holding a spear or a twig. The 'third eye' and the nose in the form of energy snakes indicate, in the opinion of some researchers, religious links with Tibet yet at present its origin, whether Tibet or the Yenisei, remains an open question. In Tibet the 'third eye' was considered to be the divine eye of wisdom and clairvoyance.[13] On the clay and plaster masks of the much later Tashtyk culture of the Minusinsk basin the red dots or spirals on the forehead most likely also designated the 'third eye'.[14]

At the ends of small stone rods are carved heads of women of mongoloid appearance (Figure 1.9–10). Their faces are flattened and sub-triangular in shape; their noses are depicted by a short vertical cylinder, the eyes by narrow lines, dots or ovals and the mouth and eyebrows by lines (Figure 2.2). Several rings descend in a row down the sides of the face from the temples. The hair on the head is rendered by lines and the sincipital area is picked out in concentric ovals.[15] Similar portrayals of women with voluminous hairstyles are also encountered on bone plates.

Anthropomorphic rods and plates are usually found in burials of teenage girls or young women, sometimes as many as several in a single burial. The ends of some rods have holes, suggesting they were worn upside-down. These objects probably symbolised the goddess-mother or family deities and served as a kind of amulet.[16] It is not impossible that they were used in an initiation process in passing from the younger to older age group and it may be that during religious rituals the rods were inserted into small doll-torsos of organic materials which have not survived (cloth, leather or wood).

There is a large number of symbols and signs of various different shapes on Okunev statues and slabs (Figure 1). The way individual signs may have been formed can be seen by the example of a cultic stone object with a half-lunar shape (Figure 3.1). The outer contour of this object forms a quarter of its circumference (Figure 3.2). The object can be accommodated inside the circle in two positions, with the convex side up or down (Figure 3.2–4). The resulting figures – a square and a rhombus – are reminiscent of the widespread symbols on stone statues, plates and the bottoms of vessels of Okunev culture (Figure 3.5–11), and later on objects of the 'Cimmerian' and Scythian cultures of Eurasia (Figure 5.20–21, 24–25). This ritual object is believed by the author to have had a number of sacral functions: a quarter of a month (a week) and the four seasons, etc.

Megaliths in Siberia and Britain

In terms of the significance of its megalithic objects the Okunev culture in Siberia resembles the impact of the henge monuments of Britain. From the Bronze Age onwards most of the stone statues and a number of the vertical slabs in these areas were oblique at the top, with a tall eastern edge and a lower western part, reflecting the fact that the sun rises in the east and sets in the west. Brief mention should be made of the similarity in shape and, probably, sacral functions of a number of tall Bronze Age megalithic stelae in Britain and Siberia. In the 'Ring of Brodgar' on the Orkney island of Mainland, which is in the form of a circle 104 m in diameter, the height of the individual stelae reaches 5 m (Figure 4.1). In a number of barrows near the village of Safronovo in Khakassia there are large stone stelae with drawings of different periods and reaching a height of about 6 m in the southeast corner of the wall (Figure 4.2).

Huge slabs from Bronze Age monuments were also partly used to build the largest megalithic complex in Siberia: the Great Salbyk Barrow in the centre of Khakassia which was excavated by Sergey Kiselyov's expedition in 1954–56 and relates to the 7th century BC Tagar culture (Figure 4.4). The stone wall surrounding the Great Salbyk Barrow and measures 71 x 71 m, was constructed of 90 large vertical and horizontal slabs, each weighing up to 100 tons (Figure 4.3–4). In its monumental stone construction and the amount of labour expended, the Great Salbyk Barrow might be compared with the famous Stonehenge in England. There are another 14 large barrows with monumental stone walls in Salbyk, as well as dozens of smaller barrows in neighbouring

[13] Machinsky 1997.
[14] Kuzmin 2006.
[15] Vadetskaya, Leontiev and Maximenkov 1980: 25.
[16] Marsadolov 1994.

Figure 2. Artefacts of Okunev culture: 1, stone slab with depiction of a fabulous beast (Chernovaya-VIII burial ground; stone, L 118 x 89 cm; The State Hermitage Museum, St. Petersburg, inv. nr. 2441/1); 2, cult rod depicting a woman's head (Chernovaya-VIII burial ground, barrow 5, Grave 9; steatite, H 4.1 cm; The State Hermitage Museum, St. Petersburg, inv. nr. 2376/58); 3, fragment of a slab with drawing of an ox (Razliv-X burial ground, Grave 8; sandstone, 65 x 35 cm; The State Hermitage Museum, St. Petersburg, inv. nr. 2702/6); 4, figure of a bear (Karasuk-II burial ground, Grave 3; bone, L 4.4 cm; The State Hermitage Museum, St. Petersburg, inv. nr. 2304/3)

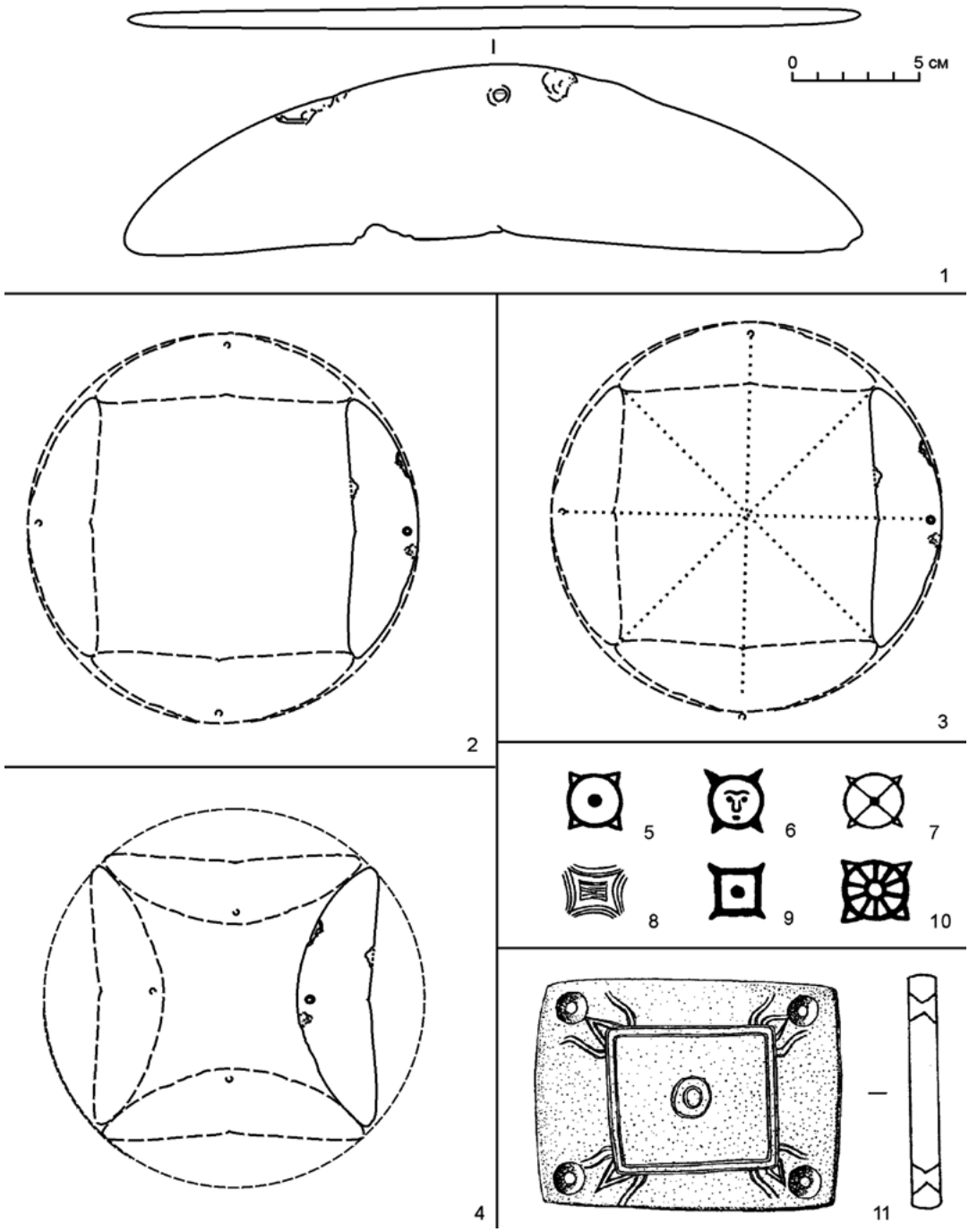

Figure 3. Cult pendant in the shape of a half-moon. Chernovaya-VIII burial ground, barrow 8; stone, L 29 cm; The State Hermitage Museum, St. Petersburg, inv. nr. 2377/45: 1, overall view and cross-section; 2–4, diagrams of the marking out of a circle using this object; 5–10, sacral symbols on objects of Okunev culture; 11, stone pendant with symbol from the Uybat-V burial ground (5–11, from Leontiev, Kapelko and Esin 2006: 24, fig. 8.1, 58, table 3)

valleys.[17] Indeed, like Stonehenge, Salbyk is situated on a small natural rise in the centre of an extensive plain. Lengthy astronomical observations and measurements have been carried out on these monuments, and the stone slabs used to build them were brought long distances from special quarries.[18]

[17] Marsadolov 2010.
[18] Hawkins and White 1965.

Links between the Okunev and later Scythian and Tashtyk cultures

Archaeologists have often noted the influence of Okunev culture, imagery and traditions on later cultures of Sayan-Altai and other regions of Eurasia. The Okunev sacral imagery in the shape of 'a circle within a circle' or 'a square with a slanting cross'

No.	Object	Monument	Museum, region	Material	Dimensions in cm	Publication
1	Statue	Chalgys oba	Khakassia National Local History Museum named after L.R. Kyzlasov, Abakan	granite	290 x 55 x 65	Leontiev, Kapelko and Esin 2006: 118, no. 34
2	Statue	Patankov	Khakassia National Local History Museum named after L.R. Kyzlasov, Abakan	sandstone	140 x 45 x 40	Leontiev, Kapelko and Esin 2006: 111, no. 21
3	Slab	Chernovaya-1	State Historical Museum, Moscow	sandstone	180 x 140 x 15	Vadetskaya, Leontiev and Maximenkov 1980: 131, table XL.59
4	Stele	Razliv-X	State Hermitage Museum, St. Petersburg	sandstone	190 x 86	Leontiev, Kapelko and Esin 2006: 197, no. 222
5	Statue	Shira	Khakassia National Local History Museum named after L.R. Kyzlasov, Abakan	sandstone	290 x 80 x 25	Leontiev, Kapelko and Esin 2006: 143, no. 103
6	Statue	Ust-Byur	Minusinsk Local History Museum named after N.M. Martyanov, Minusinsk	sandstone	250 x 70 x 40	Leontiev, Kapelko and Esin 2006: 147, no. 111
7	Stele	Tazmin	Minusinsk Local History Museum named after N.M. Martyanov, Minusinsk	granite	280 x 50 x 35	Leontiev, Kapelko and Esin 2006: 141, no. 98
8	Statue	Uybat	Khakassia National Local History Museum named after L.R. Kyzlasov, Abakan	granite	30 x 20	Leontiev, Kapelko and Esin 2006: 151, no. 122
9	Rod	Tashtyp	State Hermitage Museum, St. Petersburg	stone	L 4.6	Vadetskaya, Leontiev and Maximenkov 1980: 115, table XXIV.9
10	Rod	Chernovaya-VIII, barrow 9, grave 7	State Hermitage Museum, St. Petersburg	stone	L 4.5	Vadetskaya, Leontiev and Maximenkov 1980: 115, table XXIV.2
11	Petroglyph	Cheremushnoy Log	Khakassia	stone	-	Leontiev, Kapelko and Esin 2006: 152, no. 128
12	Petroglyph	Tyurya Mountain	Khakassia	stone	-	Leontiev, Kapelko and Esin 2006: 152, no. 127
13	Slab	Chernovaya-VIII, barrow 4, grave 8	State Hermitage Museum, St. Petersburg	sandstone	140 x 85	Leontiev, Kapelko and Esin 2006: 148, no. 114
14	Stele	Ulus Onkhakov	Khakassia National Local History Museum named after L.R. Kyzlasov, Abakan	sandstone	250 x 130 x 25	Leontiev, Kapelko and Esin 2006: 118, no. 32
15	Incense burner	Chernovaya-VIII, barrow 11, grave 8	State Hermitage Museum, St. Petersburg	Clay	D 2.3 H 14	Vadetskaya, Leontiev and Maximenkov 1980: 120, table XXIX.8
16	Vessel	Chernovaya-VIII barrow 8, grave 21	State Hermitage Museum, St. Petersburg	Clay	D 10 H 11.5	Vadetskaya, Leontiev and Maximenkov 1980: 120, table XXIX.4
17	Temporal ring	Chernovaya-VIII, barrow 8, grave 20	State Hermitage Museum, St. Petersburg	bronze	D 5	Vadetskaya, Leontiev and Maximenkov 1980: 110, table XIX.6
18	Stele	Chernovaya-VIII, barrow 5, grave 8	State Hermitage Museum, St. Petersburg	sandstone	125 x 65 x 8	Leontiev, Kapelko and Esin 2006: 148, no.116

Table 1. Depictions and artefacts of Okunev culture in Khakassia (see Figure 1)

No.	Object	Monument	Museum, region	Material	Dimensions in cm	Publication
19	Slab	Askyz	Minusinsk Local History Museum named after N.M. Martyanov, Minusinsk	sandstone	105 x 100 x 12	Leontiev, Kapelko and Esin 2006: 176, no. 188
20	Staff	Chernovaya-VIII, barrow 8, grave 21	State Hermitage Museum, St. Petersburg	Horn	leLngth 25	Vadetskaya, Leontiev and Maximenkov 1980: 114, table XXIII.1
21	Statue	Tyoya	only drawing	diorite	49 x 10 x 8	Leontiev, Kapelko and Esin 2006: 189, no. 211
22	Harpoon	Chernovaya-VIII, barrow 4, grave 5	State Hermitage Museum, St. Petersburg	Bone	L 17.8	Vadetskaya, Leontiev and Maximenkov 1980: 111, table XX.11

Table 1. Continued

within a circle (Figure 5.6)[19] continued during the early Scythian period in Sayan-Altai and central Asia with the so-called *kereksurs* – large stone objects of various shapes 'with rays' – including those in the 9th century BC barrow at Arzhan-1 in Tuva (Figure 5.18–19).[20] The symbolic depictions of the slanting cross, the rhombus and the square with a circle in the centre which were characteristic of Okunev culture (Figure 5.1–5), as well their artistic decoration of zoomorphic images by broken or winding cross lines, are also encountered later on the 'deer' stones and petroglyphs of Sayan-Altay and Mongolia (Figure 5.20–21, 24–25). Many archaeologists believe that the sources of the 'Cimmerian symbol' of a 'rhombus in a circle' should be sought in the stone statues of Okunev culture (Figures 5.1–2, 5; 1.5–7, 18).[21]

Two or three symbolic straight or oblique lines are found on the obverse side of Okunev stone statues, as well as on the 'deer' stones of Sayan-Altai and on some plaster masks of the later Tashtyk culture (Figure 5.7–8, 22–23).[22] Traces of paint on stone statues and on human crania found in Okunev burials suggest that they reflect the custom of ritual painting or tattooing of the face and body, a custom which survived in Siberia in the Scythian period in the tattoos of bodies in the Pazyryk barrows and also reflected on the plaster funerary masks of the Tashtyk culture.[23]

An Okunev slab from Chernovaya VIII depicts a fabulous beast with the features of several animals (Figure 2.1). The beast is shown in an aggressive pose with the sinewy body of a wolf, the head of a bear with bared teeth and lolling tongue and the claws of a bird with spurs. This theme may be connected with the myth that was widespread in the Bronze Age of a fantastic beast of prey devouring the sun. The drawing of the beast is overlaid on the depiction of a three-eyed mask, partly visible beneath its feet. The lines carved into the stone to depict masks, beasts and symbols were highlighted with red ochre in a number of instances.[24]

Okunev statues and petroglyphs often depict a beast of prey with bared teeth and a long tongue (Figure 5.9–11).[25] A number of Okunev stylistic elements are also characteristic in the depiction of the head of a 'panther' on a bronze plaque from the Arzhan-1 barrow, on a stone plate from Tuva (Figure 5.26–27)[26] and on other objects found in later burials in Eurasia (Figure 5.28–29). The head of the beast of prey or hoofed animal, consisting of two symmetrical halves, was depicted both on Okunev stelae and on later objects from the early Scythian, Pazyryk and Sauromatian periods (Figure 5.12–13, 30–33).[27]

It may be that beasts of prey and ungulates were depicted not only on statues and 'deer' stones, but also on clothing and as tattoos. These do not survive from the period of the Okunev culture yet are preserved in the exceptional permafrost conditions of the later Pazyryk burials of the Altai region, such as the famous large depiction of a big feline represented as a tattoo on a chieftain in the Pazyryk-5 barrow (Figure 6.9–11);[28] the drawing of the beast on this tattoo is on the back and shoulder of the torso of this person (Figure 6.10). Similar images of beasts of prey occur much earlier at the level of the symbolic shoulders of a person represented on anthropomorphic statues of the Okunev culture and 'deer' stones from the village of Arzhan (Figure 6.1, 7–9). The method of conveying the tiger's skin on Pazyryk tattoos goes back to the depictions of beasts of prey on a dagger from Arzhan-2 and a wooden block from Bashadar-2 (Figure 6.4–5, 10).[29]

[19] Kyzlasov 1987; Komarova 1981; Lazaretov 2012.
[20] Gryaznov 1980; Marsadolov 2000; 2007; 2009.
[21] Ryabkova 2010.
[22] Leontiev, Kapelko and Esin 2006; Volkov 2002; Marsadolov 2005; 2017; Vadetskaya 2009.
[23] Pankova 2017; Vadetskaya 2009; Simpson and Pankova eds 2017: 344–45, cats 260–61.
[24] Leontiev, Kapelko and Esin 2006: 20, 22.
[25] Sher 1998; Kubarev 2009.
[26] Marsadolov 2012.
[27] Rudenko 1960; Sher 1998; Korolkova 2006.
[28] Pankova 2017: fig. 5.3.
[29] Rudenko 1960; Chugunov 2011*b*.

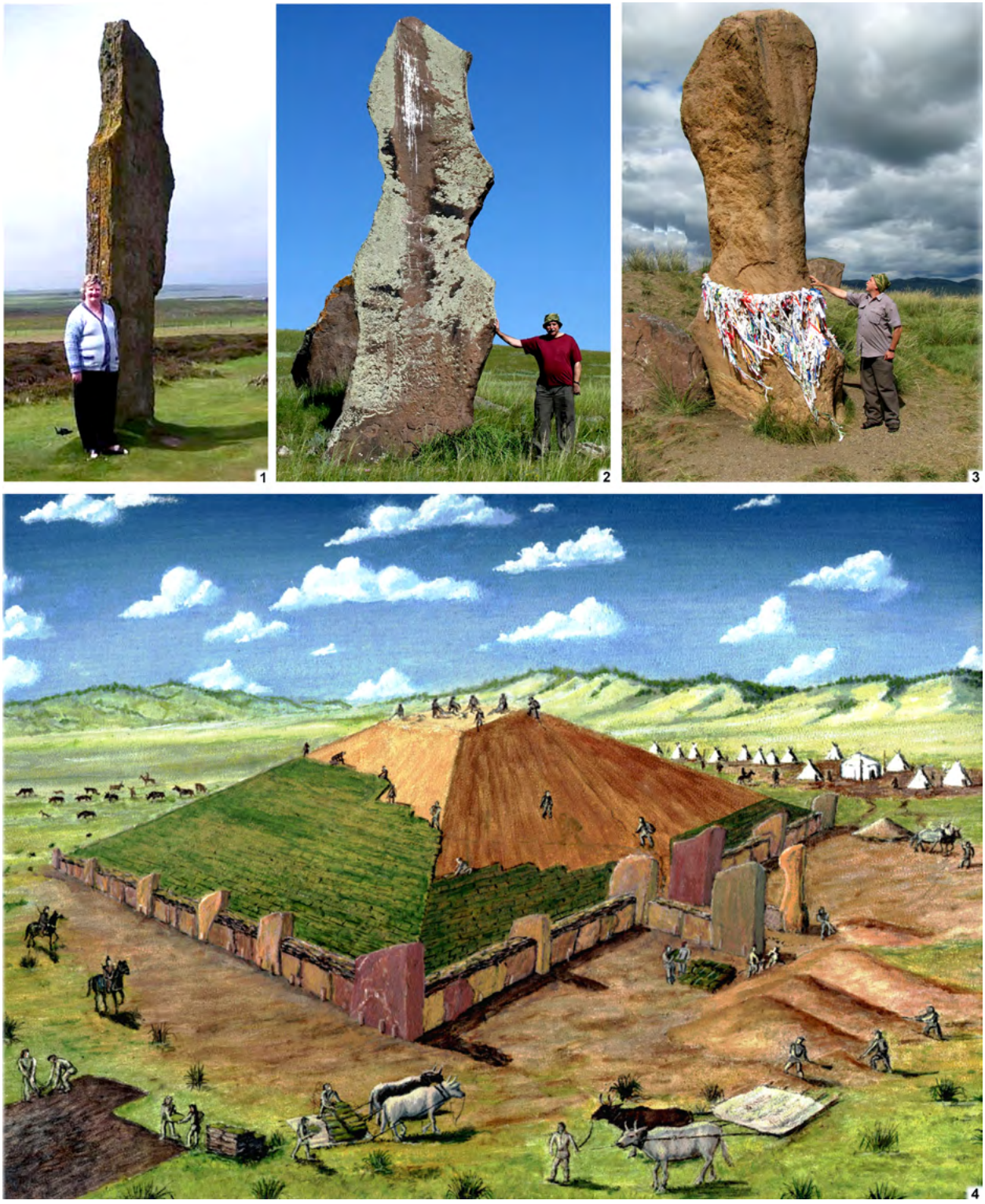

Figure 4. Megaliths in southern Siberia and Britain: 1, stele from the 'Ring of Brodgar' in Scotland (H *c.* 5 m); 2, stele in the southeast corner of the wall of a barrow in the Safronovo burial ground in Khakassia (H *c.* 6 m); 3, 'Fertility Stele' at the entrance to the Great Salbyk Barrow in Khakassia (H 5.4 m); 4, the process of building the stone wall and facing of the Great Salbyk Barrow in Khakassia (reconstruction by L.S. Marsadolov and artist-archaeologist S.S. Zyablitsky)

The geometrically stylised elegant depictions of Okunev oxen continued in the images of hoofed animals which became widespread across Eurasia during the early Scythian period (Figure 5.14–15, 34–36). Contour drawings of animals in a similar style are found on Okunev statues and slabs, 'deer' stones, rock art and the later Pazyryk tattoos (Figure 6.6a, 9a, 12). On the central panel of Kalbak-Tash in the Altai mountains there is a

Figure 5. Correlating depictions of Okunev culture (*1-17*), Scythian (*18-22, 24-38*) and Tashtyk period (*23*) (Table 2)

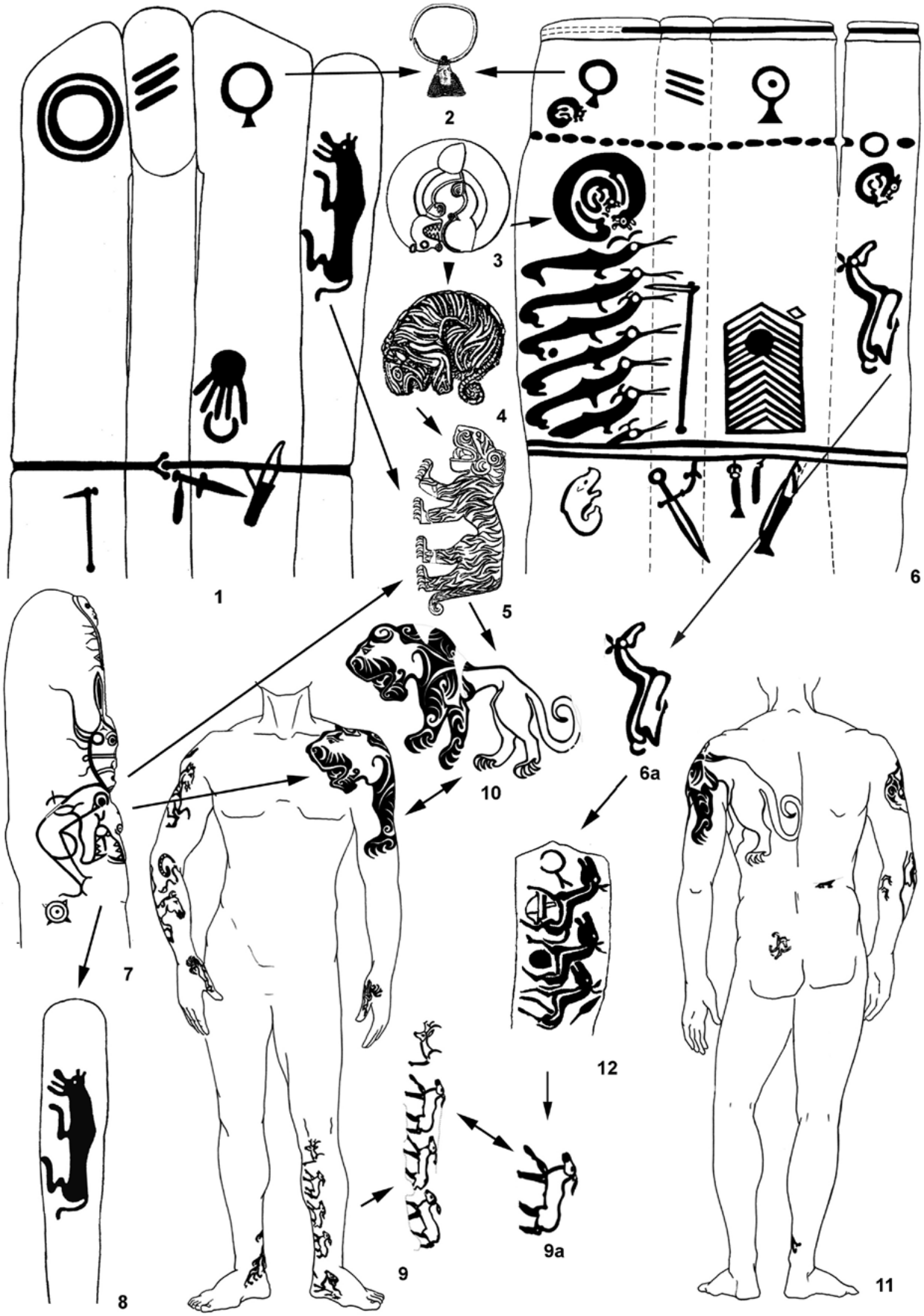

Figure 6. Depictions on stone statues, artefacts and tattoos *Stone statues*: 7, Okunev culture, 3rd millennium BC; 1, 6, 8, 12, 'deer' stones, 8th–7th centuries BC. *Artefacts*: 2, 4, 7th century BC; 3, 8th century BC; 5, 6th century BC (Table 3)

No.	Object	Monument	Museum, Region	Material	Publication
1	Symbol on statue	Solyonoozyornoye	Khakassia National Local History Museum named after L.R. Kyzlasov, Abakan	sandstone	Leontiev, Kapelko and Esin 2006: 115, no. 24
2	Symbol on statue	Novaya Chyornaya	Khakassia National Local History Museum named after L.R. Kyzlasov, Abakan	sandstone	Leontiev, Kapelko and Esin 2006: 132, no. 68
3	Symbol on stele	Chernovaya-I	State Historical Museum, Moscow	sandstone	Vadetskaya, Leontiev and Maximenkov 1980: 131, table XL.59
4	Symbol on stele	Arban-II	Poltakov settlement	sandstone	Leontiev, Kapelko and Esin 2006: 184, no. 201
5	Symbol on bottom of vessel	Chernovaya-VIII, barrow 8, grave 21	State Hermitage Museum, St. Petersburg	pottery	Vadetskaya, Leontiev and Maximenkov 1980: 120, table XXIX.4
6	Barrow + Facing	Tuim	Khakassia	Stone	Kyzlasov 1987: 144, fig. 1
7	Depiction on statue	Belyo	Khakassia	sandstone	Leontiev, Kapelko and Esin 2006: 156, no. 140
8	Depiction on stele	Tazmin	Minusinsk Local History Museum named after N.M. Martyanov, Minusinsk	granite	Leontiev, Kapelko and Esin 2006: 141, no. 98
9	Depiction on stele	Chernovaya-VIII, barrow 4, graves 7-8	State Hermitage Museum, St. Petersburg	sandstone	Leontiev, Kapelko and Esin 2006: 148, no. 117
10	Fragment of statue	Shira	Khakassia National Local History Museum named after L.R. Kyzlasov, Abakan	sandstone	Leontiev, Kapelko and Esin 2006: 143, no. 103
11	Fragment of staff	Chernovaya-VIII, barrow 8, grave 21	State Hermitage Museum, St. Petersburg	Horn	Vadetskaya, Leontiev and Maximenkov 1980: 114, table XXIII.1
12	Depiction on stele	Razliv X	State Hermitage Museum, St. Petersburg	sandstone	Leontiev, Kapelko and Esin 2006: 197, no. 222
13	Depiction on slab	Ust-Byur	Minusinsk Local History Museum named after N.M. Martyanov, Minusinsk	granite	Vadetskaya, Leontiev and Maximenkov 1980: 142, table LI.111
14	Depiction on slab	Askyz	Minusinsk Local History Museum named after N.M. Martyanov, Minusinsk	sandstone	Leontiev, Kapelko and Esin 2006: 176, no. 188
15	Depiction on slab	Askyz	Minusinsk Local History Museum named after N.M. Martyanov, Minusinsk	sandstone	Leontiev, Kapelko and Esin 2006: 176, no.188
16	Depiction on slab	Chernovaya-VIII, barrow 4, graves 7-8	State Hermitage Museum, St. Petersburg	sandstone	Leontiev, Kapelko and Esin 2006: 148, no. 117
17	Petroglyph	Kalbak-Tash	Altai	Stone	Kubarev 2009: 201, fig. 133.2
18	Kereksur + facing	Yustyd	Altai	Stone	Marsadolov 2007: 88, fig. 29.17
19	Kereksur + facing	Yustyd	Altai	Stone	Marsadolov 2007: 88, fig. 29.3
20	Decoration of a horse's bridle	Bashadar-2	State Hermitage Museum, St. Petersburg	bronze, gold	Rudenko 1960: 87, fig. 50
21	Decoration of a horse's bridle	Bashadar-2	State Hermitage Museum, St. Petersburg	bronze, gold	Rudenko 1960: 86, fig. 49d
22	Fragment of statue	Arzhan	State Hermitage Museum, St. Petersburg	Stone	Marsadolov 2017: 28, fig. 63
23	Mask-bust	Uybat, barrow 11	State Historical Museum, Moscow	plaster	Vadetskaya 2009: t. 36*b*
24	Pattern on carpet	Pazyryk-5	State Hermitage Museum, St. Petersburg	Felt	Rudenko 1960: 251, fig. 128k
25	Fragment of pattern on carpet	Pazyryk-5	State Hermitage Museum, St. Petersburg	Felt	Rudenko 1960: 251, fig. 128k
26	Fragment of plaque	Arzhan-1	National Museum of the Republic of Tuva named after Aldan-Maadyr, Kyzyl	Bronze	Gryaznov 1980: 28, fig. 15.4

Table 2. Correlation of depictions of Okunev culture, Scythian and Tashtyk periods (see Figure 5)

No.	Object	Monument	Museum, Region	Material	Publication
27	Fragment of plaque	Khorum-Dag	National Museum of the Republic of Tuva named after Aldan-Maadyr, Kyzyl	Stone	Marsadolov 2012: 210, fig. 3.5
28	Plaque	Makeevka, barrow 491	State Hermitage Museum, St. Petersburg	Bronze	Korolkova 2006: 208, table 40.2
29	Plaque	Pazyryk-4	State Hermitage Museum, St. Petersburg	Wood	Rudenko 1960: 295, fig. 150g
30	Fragment of plaque	Pazyryk-2	State Hermitage Museum, St. Petersburg	Horn	Rudenko 1960: 295, fig. 150a
31	Fragment of plaque	Arzhan-1	National Museum of the Republic of Tuva named after Aldan-Maadyr, Kyzyl	Bronze	Gryaznov 1980: 28, fig. 15.4
32	Plaque	Zhurovka	State Hermitage Museum, St. Petersburg	Bronze	Korolkova 2006: 182, table 13.23
33	Pendant	Pazyryk-5	State Hermitage Museum, St. Petersburg	Horn	Rudenko 1960: 303, fig. 154d
34	Petroglyph	Sulfatskaya	Khakassia	Stone	Marsadolov 2010: fig. 64.18
35	Depiction on statue	Arzhan-1	National Museum of the Republic of Tuva named after Aldan-Maadyr, Kyzyl	Stone	Gryaznov 1980: 43, fig. 29.2
36	Depiction on vessel	Sialk B	Iran	painted pottery	Marsadolov 2010: fig. 64.15
37	Fragment of tattoo	Pazyryk-2	State Hermitage Museum, St. Petersburg	human skin	Kubarev 2009: 201, fig. 133.9
38	Petroglyph	Elangash	Altai	Stone	Kubarev 2009: 201, fig. 133.3

Table 2. Continued

No.	Object	Monument	Museum, Region	Material	Publication
1	Deer stone	Arzhan	State Hermitage Museum, St. Petersburg	Stone	Marsadolov 2017: 28, fig. 63
2	Earring	Boytygem-II, barrow 19	Museum of the Archaeology and Ethnography of Altai, Altai State University, Barnaul	Gold	Tishkin 1999: 189, fig. 1.1
3	Plaque	Arzhan-1	National Museum of the Republic of Tuva named after Aldan-Maadyr, Kyzyl	Bronze	Gryaznov 1980: 28, fig. 15.4
4	Depiction on dagger	Arzhan-2	National Museum of the Republic of Tuva named after Aldan-Maadyr, Kyzyl	iron, gold	Chugunov 2011*b*: 47, fig. 7.1
5	Depiction on block	Bashadar-2	State Hermitage Museum, St. Petersburg	Wood	Rudenko 1960: 48, fig. 23
6	Deer stone No. 2	Arzhan	National Museum of the Republic of Tuva named after Aldan-Maadyr, Kyzyl	Stone	Marsadolov 2005: 306, fig. 3
7	Statue	Shira	Khakassia National Local History Museum named after L.R. Kyzlasov, Abakan	sandstone	Leontiev, Kapelko and Esin 2006: 143, no. 103
8	Fragment of deer stone	Arzhan	State Hermitage Museum, St. Petersburg	Stone	Marsadolov 2017: 28, fig. 63
9-11	Tattoo of a man	Pazyryk-5	State Hermitage Museum, St. Petersburg	human skin	Pankova 2017: fig. 5.3
12	Deer stone	Altan Sandal	Mongolia	Stone	Volkov 2002: 119, table 4.1

Table 3. Depictions on stone statues, artefacts and tattoos from the Okunev culture and Scythian period (see Figure 6)

large Bronze Age drawing of a fabulous beast with a massive body, an open mouth with sharp teeth, a large round eye, two raised ears, two bent legs with long claws and a long tail raised above its back and divided into ten or more sections (Figure 5.17). This image was known not only in Altai and Yenisei in the Okunev period but also later on in the Scythian period in Sayan-Altai and other regions (Figure 5.16, 37–38).[30]

[30] Kubarev 2009; Rudenko 1960.

1200 year periods of the appearance of stone statues

In the history of Siberia one can identify four main 'waves' of the occurrence of stone statues varying in appearance and semantics, divided into periods of 1200 years (Figure 7):

- the Bronze Age: 21st–19th centuries BC and earlier;
- the Early Iron Age: 9th–7th centuries BC in Sayan-Altai;
- the Early Middle Ages (ancient Turkic period): 6th–9th centuries;
- the 'New Age': 18th–20th centuries (sculptures of rulers and prominent people).

The earliest Okunev statues are the most complex in sacral representativeness and semantics, while the later Turkic and modern statues of rulers are the most realistic.[31] Large Bronze Age stelae, slabs and other stone objects were re-used in the Iron Age, then in the Middle Ages and later, right up to present-day construction. The obverse part on 'deer' stones, as on Okunev statues, was placed on the narrow edge of stone stelae. 'Deer' stones also occasionally featured beasts of prey with open mouths.

Stone statues were quite often an important constituent part of ritual centres or complexes which included various stone structures, petroglyphs and *kereksurs*. Each statue is a 'closed' archaeological complex and offering a valuable source of information about the objects, adornments and complex images of animals depicted on them. It is possible that each of these long periods was linked with great migrations yet the seemingly eternal stone statues greeted these waves of new settlers in the steppes, who sometimes overturned them, partly or completely re-worked them and erected new obelisks and structures as long-term 'guarantees' of living in a particular region with their links to the past and their predecessors. Archaeological materials prove that the anthropomorphic obelisks and slabs with Bronze Age drawings which still stand in the steppe valleys of Sayan-Altai influenced the statues of the pre-Scythian Turkic period and have been used regularly by various people up to modern times.[32]

Conclusion

The examples discussed here show the continuity of religious beliefs and pictorial traditions in Sayan-Altai over a prolonged period of time. The anthropologist Alexander Kozintsev concluded that there was 'an exceptional similarity between the steppe Scythians of the northern Black Sea region' and 'the Okunev group from Tuva, which is manifested at every level'; at the same time, 'the anthropological links [of the steppe Scythians] with the "neighbouring" nomadic world (Sauromat, Saks) are not numerous and cannot be compared in importance with "distant" (central Asian) links'.[33] Monumental columnar stone statues with realistically carved human faces and stones and slabs with fantastic images still stand across the steppes of Khakassia. These remarkable examples of monumental and sacral art have survived for millennia, can still be seen in their original landscape and time and again have served as sources for creative re-interpretation of their images in subsequent historical ages.

[31] Marsadolov 2014.

[32] Kyzlasov 1964; Sorokin 1968; Volkov 2002; Marsadolov 2014.

[33] Kozintsev 2007: 155.

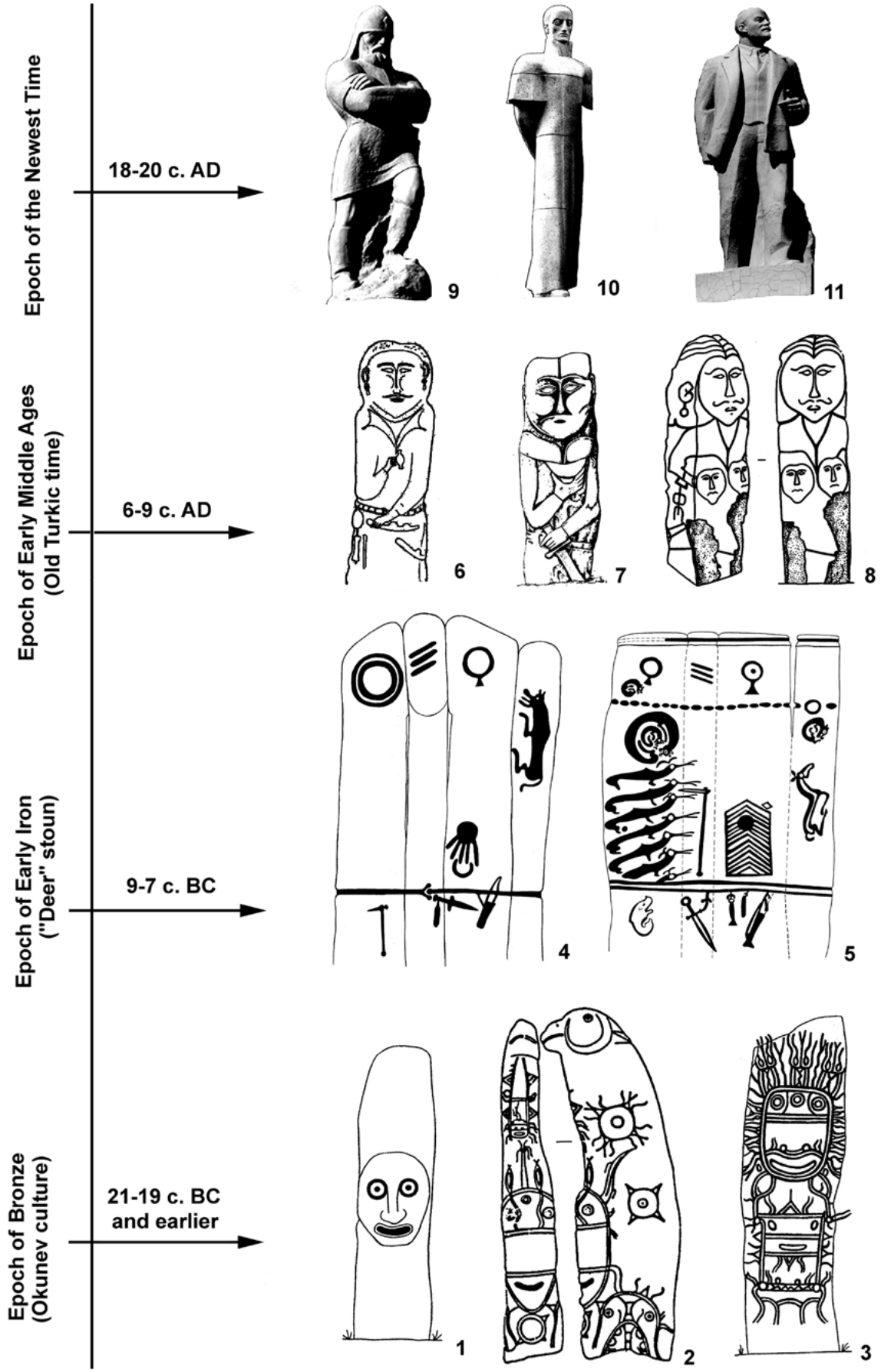

Figure 7. The four principal phases of the occurrence of stone statues: 1–3, Bronze Age; 4–5, early Scythian period; 6-8, ancient Turkic period; 9–11, sculptured monuments of the 'New Age' (Table 4)

No.	Object	Monument	Museum, Region	Material	Publication
1	Statue	Chalgys oba	Khakassia National Local History Museum named after L.R. Kyzlasov, Abakan	Granite	Leontiev, Kapelko and Esin 2006: 118, no. 34
2	Statue	Ust-Byur	Minusinsk Local History Museum named after N.M. Martyanov, Minusinsk	sandstone	Leontiev, Kapelko and Esin 2006: 147, no. 111
3	Stele	Tazmin	Minusinsk Local History Museum named after N.M. Martyanov, Minusinsk	Granite	Leontiev, Kapelko and Esin 2006: 141, no. 98
4	Deer stone	Arzhan	State Hermitage Museum, St. Petersburg	Stone	Marsadolov 2017: 28, fig. 63
5	Deer stone No. 2	Arzhan	National Museum of the Republic of Tuva named after Aldan-Maadyr, Kyzyl	Stone	Marsadolov 2005: 306, fig. 3
6	Statue	Dzhumaly	State Hermitage Museum, St. Petersburg	Stone	Sorokin 1968: 261, fig. 2.1
7	Statue	Chadaan	National Museum of the Republic of Tuva named after Aldan-Maadyr, Kyzyl	Stone	Kyzlasov 1969*a*: 28, fig. 3.5
8	Statue	Khenderge	National Museum of the Republic of Tuva named after Aldan-Maadyr, Kyzyl	Stone	Kyzlasov 1964: 35, fig. 3
9	Monument	Ermak	Zmeinogorsk	concrete	Restored in 2006
10	Monument	The Decembrists (fragment)	Yekaterinburg	Stone	Sculptor: V. Sokolov, 2000
11	Monument	Statue of Lenin	Norilsk	concrete	Sculptor: S. Merkulov, 1954

Table 4. The four principal phases of the occurrence of stone statues (see Figure 7)

Scientific analyses of some glass beads from Scythian and later sites in southern Siberia

Andrew Meek,[1] Nikolai N. Nikolaev,[2] St John Simpson[3]

Abstract

A group of glass beads from late Scythian graves at Aymyrlyg and two groups of re-strung beads from a post-Scythian hoard at Znamenka were examined as part of a programme of scientific analysis associated with the exhibition *Scythians: warriors of ancient Siberia* at the British Museum. All belong to the collections of the State Hermitage Museum and were analysed with permission as part of the exhibition loan agreement. Non-destructive compositional analysis was carried out on the surface of the objects using a combination of XRF and VP-SEM-EDX. Using the compositional data it was possible to characterise and differentiate the types of glass used in the production of these objects. Using published analytical data for contemporary glasses we are able to suggest an approximate provenance for each of the object types.

Keywords: Glass beads; provenance; XRF; SEM-EDX; natron; plant ash

Introduction

Beads are barometers of fashion, personal style, contact and trade. Different cultures value and wear them in various ways, whether as necklaces, embroidery, hairstyles or talismans. Their colour, design and shape have resonated differently among local communities, whether mobile or settled, but understanding their origins has been a perennial question in archaeology: advances in archaeological science now allow a better understanding of the sources of the materials used to make them and therefore offer a new way of analysing ancient circulation patterns and appreciating the true significance of these tiny objects.

It was for these reasons that, as part of preparations for the exhibition *Scythians: warriors of ancient Siberia* in 2017, two groups of glass beads were subjected to scientific analysis in the Department of Scientific Research at the British Museum. The objects analysed included *c.* 3rd century BC blue and white 'eye' beads from Aymyrlyg, and two groups of re-strung beads from the Znamenka hoard which is conventionally dated to the 1st century BC–1st century AD, and both situated in southern Siberia (Figure 1). The aim of this study was to use scientific analysis to discover more about how these objects were made and where the glass used to produce them originated.

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Methodology

It was not possible to destructively sample these glasses and analysis was carried out on the surface of the objects using two complimentary analytical techniques. Over time most types of ancient glass deteriorate and the alkalis (soda and potash) leach out from the surface forming a silica-rich layer depleted in alkalis.[4] These changes will mean that the other oxides, particularly silica due to its enrichment at the surface of the glass, are over-estimated. The analytical results presented here should therefore be considered semi-quantitative and only approximate values or presence/absence are discussed in this paper.

X-ray Fluorescence (XRF)

A Bruker Artax XRF was used with the following operating conditions: helium atmosphere, 50 kV, 0.5 mA current, 0.65 mm diameter collimator and 200 seconds counting time (Figure 2a). Qualitative analysis was carried out using Corning Museum of Glass standards A-D as comparative glasses.

Scanning Electron Microscopy with Energy Dispersive X-ray Spectrometry (SEM-EDX)

A Hitachi S3700 SEM was used with the following operating conditions: variable pressure vacuum mode, 20kV electron beam, 0-10keV spectral range, 2.30nA current and 150 seconds live time (Figure 2b). Semi-quantitative analysis was carried out using Oxford Instruments Aztec software and a calibration produced using metal, mineral and oxide standards.

[4] Newton and Davison 1989: 136.

Figure 1. Objects discussed in this paper: a. blue and white 'eye' beads, 3rd century BC, Aymyrlyg (The State Hermitage Museum, St Petersburg, inv. nr. 2940/4/1-4); b. 'amphora'-shaped beads, *c.* 1st century BC–1st century AD, Znamenka (The State Hermitage Museum, St Petersburg, inv. nr. 2715/102); c. striped beads, *c.* 1st century BC–1st century AD, Znamenka (The State Hermitage Museum, St Petersburg, inv. nr. 2715/98)

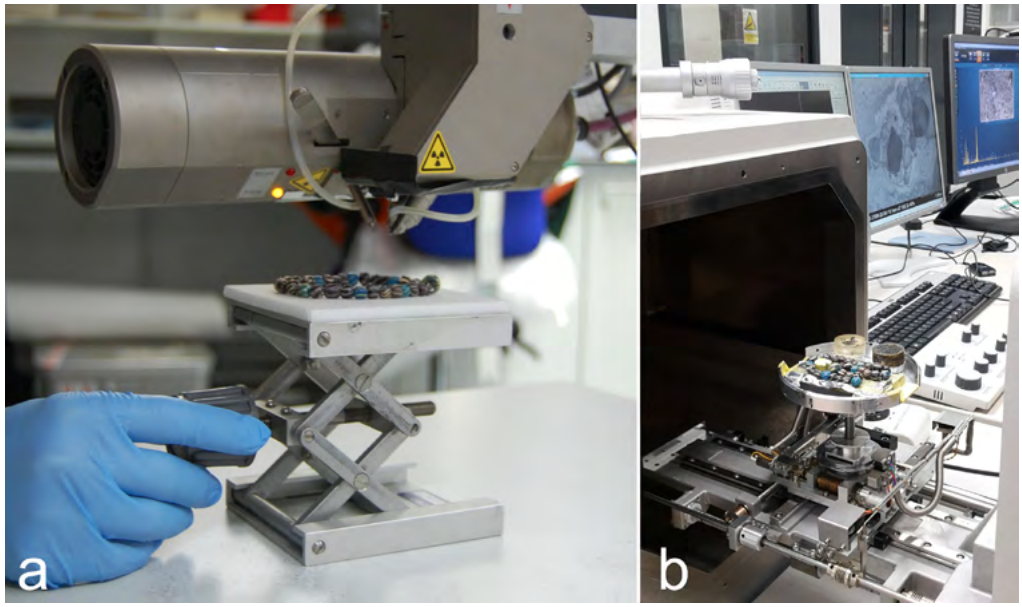

Figure 2. Striped beads, *c.* 1st century BC–1st century AD, Znamenka (The State Hermitage Museum, St Petersburg, inv. nr. 2715/98) undergoing analysis: a. XRF, b. SEM-EDX

Results and discussion

'Eye' beads from Aymrylyg

Glass 'eye' beads are a well-known type of eastern Mediterranean bead which was widely traded around the Mediterranean and into the surrounding areas during the second half of the 1st millennium BC. They also entered the Black Sea region and from there penetrated into northwest Iran,[5] and circulated across the Eurasian steppe where many examples have been found in Scythian and Sarmatian graves.[6] During about

[5] E.g., Ghalekuti I (tombs 5, 9) and II (tomb 3) in the Dailaman area of Gilan province (Sono and Fukai 1968: 38–41, 44–45, pls XLVI.16, L.6a–b, LII.16, LIII.4, LXXIX.8–9, LXXXV.34–36, LXXXVII.18, 27; cf. Haerinck 1989: 459).

[6] E.g., Filippovka-1, kurgan 28, burial 1, skeleton 2 (Yablonsky 2013: 194, cats 2554–58), Taksai-1 (Sdykov and Lukpanova 2013: 202–203).

	Compositional type	Colourants	Opacifiers
'eye' beads (2940/4/1-4)	natron	blue = cobalt	white = calcium antimonate
striped beads (2715/98)	plant ash	blue-green = copper 'black'/purple = manganese	yellow = lead stannate white = quartz
'amphora' beads (2715/102)	plant ash	blue = copper green = copper/iron amber = iron 'black'/purple = manganese	

Table 1. Summary of analytical results and interpretation

the same period other types of 'eye' beads were made in China.

Four glass 'eye' beads were analysed from *c.* 3rd century BC burials excavated by A.M. Mandelshtam in 1971 in the late Scythian cemetery at Aymyrlyg VIII in Tuva. These were roughly spherical and each was made by wrapping a dark blue glass strip around an iron rod, which has left a dark reddish-brown stain in the perforations, and rolling the hot glass over a solid flat surface set with blobs of white glass with blue centres: repeated heating and rolling pressed these into the beads until they were smooth. These beads were assumed to be of late Phoenician origin but the existence of a Chinese 'eye' bead tradition in central Asia led to them being submitted for scientific analysis.

The chemical composition of the glass used to produce these beads was found to be low in magnesium and potassium (<1.5 wt%). This type of glass is known to have been produced using a mineral alkali source called natron and glass of this compositional type was being made around the eastern Mediterranean region from the later 1st millennium BC to the close of the 1st millennium.[7] The white opaque glass is coloured and opacified with the addition of antimony which combines with the calcium in the glass to form calcium antimonate crystals. This was the most common opacifier used in the Mediterranean region from the 2nd millennium BC to the 5th century.[8] The blue glass of the body and eyes is coloured using cobalt which is the most common strong blue colourant used in ancient glass production. Elevated iron, copper and zinc are found in the cobalt-blue glass suggesting they were added along with the cobalt colourant and may be related to its source. Similar correlations have been found in Roman glasses analysed previously.[9]

Glass beads from Znamenka

The site of Znamenka is located above the left bank of the Yenisei river in the Minusinsk Basin of Khakassia and includes the remains of a Scythian-period barrow surrounded by a later settlement; the edge of the stone enclosure wall of the Scythian tomb was later re-used as the site of concealment of a small compact hoard of personal items. These were probably interred in a bag which was placed inside a small hole sealed by a large potsherd laid flat over the top. The site was excavated in 1978 by M.L. Podolsky, director of one of the field teams of the Central Yenisei Archaeological Expedition of the Institute of Archaeology (Leningrad Branch) of the USSR Academy of Sciences (Figure 3). The hoard is

Figure 3. View of the site and environs of Znamenka (photograph: St J. Simpson, 1st June 2018)

[7] Rehren and Freestone 2015: 234.
[8] Craddock 2009: 213.
[9] E.g., Freestone and Stapleton 2015: 69.

conventionally dated between the 1st century BC and 1st century AD, although the excavator admitted that it could be slightly later.[10]

The finds have not yet been the subject of a comprehensive study but clearly originate from widely different places of production. They mainly consist of small personal ornaments and include large numbers of beads and pendants of gold, cornelian,[11] agate, turquoise, amethyst, fluorite, jet, coral,[12] pearls and a large number of coloured and decorated glass beads; there are also cowries,[13] iron knives, silver ornaments,[14] and others made of gold, [15] sometimes with an iron core.[16] The latter are paralleled from the kurgan excavated at Tenlik in the Semirechye region of southeast Kazakhstan which has been dated by the associated finds to the 3rd–2nd century BC,[17] as well as several fragments of corrugated gold sheet on an iron core which are part of the Oxus Treasure in the British Museum and hitherto assumed to be Achaemenid, like the bulk of the remainder of that collection.[18]

The glass beads are of different types and previously thought to have been imported from the northern Black Sea region, Mediterranean and/or Middle East.[19] Many were plain monochrome and of different colours.[20] There are also gold-glass beads which probably originate in an eastern Mediterranean workshop as the technology began in Egypt and a workshop has been found on Rhodes.[21] Others include opaque dark blue glass beads decorated either with 'eyes' with blue centres set in a white ground,[22] or a single white thread applied around the centre.[23] The second of these varieties have local excavated parallels: two were found in Graves 36 and 43 (kurgan 5) in a Tashtyk cemetery excavated by Dr A.I. Gotlib at Chernoe Ozero in Khakassia.[24] Although only illustrated in black and white photographs, similar beads also appear to have been found in kurgans IV,1, V,7, XIII,1 and XVII,1 in a cemetery at Tulkhar in southern Tajikistan, which the excavator dated between the 2nd century BC and 1st century AD.[25]

Another very distinctive group of beads were trapezoidal, made of bichrome dark blue, brownish yellow or light green glass and decorated with applied white threads.[26] These closely resemble semi-precious banded stone beads of the same shape and colour combination and were presumably made to imitate these for a wider market.[27] Previously assumed to come from the northern Black Sea region, they have a growing number of close parallels from within central Asia, ranging from the Minusinsk Basin and Transbaikal to Tajikistan and Pakistan.[28] A small number acquired via the art market are said to come from northern or northwest Iran.[29] A small number of identical glass beads are among finds excavated from two Tes-culture sites in Khakassia: a burial at Novaya Mochagi[30] and the cemetery of Tepsei-VII, located on the opposite bank of the Yenisei valley to Znamenka.[31] Another was found originally sewn onto a leather or cloth belt decorated with a large ornate bronze buckle in a woman's burial (tomb 9) at Terezin-I in central Tuva: this recently excavated and unrobbed Xiongnu cemetery on the banks of the Sayano-Shushenskoye reservoir is dated by AMS dates to the 1st century BC, and an AMS date on the human remains from this particular burial points more specifically to an early 1st century BC date.[32] Others were found in kurgans IV,1, VI,6 and X,3 in the cemetery at Tulkhar, in the latter case together with 'amphora'-shaped glass beads.[33] Similar beads are also exhibited together with Tashtyk finds in Minusinsk museum.[34]

The same colours and techniques were also used for a number of 'bag'-shaped glass beads found at Znamenka;[35] yet others were roughly spherical and 32

[10] Podolsky 2002; Nikolaev 2017.
[11] E.g., Nikolaev 2017: 333, cats 241–42 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/65, 2715/75.
[12] E.g., Nikolaev 2017: 335, cat. 245 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/90.
[13] E.g., Nikolaev 2012: 129, cat. 320 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/50.
[14] E.g., Nikolaev 2012: 128, cats 317–19; 2017: 332, cats 238–40 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/31, 34, 35.
[15] E.g., Nikolaev 2012: 128, cats 312–14; 2017: 331, cats 234–35 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/1, 3, 11.
[16] E.g., Nikolaev 2012: 128, cats 315–16; 2017: 331, cats 236–37 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/22, 24.
[17] Akishev and Akishev 1998: 75.
[18] Dalton 1964: 41 = The British Museum, inv. nr. 1897,1231.166–174.
[19] Vadetskaya 1999: 171–74, figs 87–88; cf. Alekseeva 1978: 43, fig. 27.
[20] E.g., Nikolaev 2012: 129, cat. 330 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/111.
[21] Weinberg 1983; Spaer 1993.
[22] E.g., Nikolaev 2012: 129, cat. 326 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/95.
[23] E.g., Nikolaev 2012: 129, cat. 329 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/106.
[24] Personal observation, St J. Simpson, July 2018: this co-author is very grateful to Dr Gotlib for kindly showing him these and other finds, and allowing him to study them.
[25] Mandelshtam 1966: figs LXII.4, LXIII.1, LXIV.1, 10; a pair of gold earrings with dolphin-shaped handles resemble a pair from the cemetery at Kalinovka (kurgan 55, burial 8) in the lower Volga region which Treister (2004: 306–307, fig. 6) places in the first half of the 1st century.
[26] E.g., Nikolaev 2012: 129, cat. 327 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/97.
[27] Lankton, Diamanti and Kenoyer 2003: 62, fig. 6.0, no. 568 = The Bead Museum, Washington D.C. (unprovenanced).
[28] Cf. Beck 1941: 60, pl. IX, no. 27 (Taxila); Vadetskaya 1999: 68; Davydova 1996: 22.
[29] Dubin 1987: 53, 338, no. 349, fig. 42 (unprovenanced, reportedly found in Iran); Fukai 1977: 59, pl. 48, bottom row: second from left (reportedly found in Gilan province = private collection, Tokyo).
[30] Kuzmin 2011: fig. 60.8–9.
[31] The State Hermitage Museum, St. Petersburg, inv. nr. 2757/71, unpublished find from the 1975–1977 Krasnoyarsk Expedition; cf. Gryaznov *et al.* 1979: 12–15, 51–52.
[32] Leus and Bel'skiy 2016: figs 4, 5.31; Kilunovskaya and Leus 2018*a*: fig. 18: 7, 13, 20; 2018*b*: fig. 18.
[33] Mandelshtam 1966: figs LXII.1, LXIII.9, 13.
[34] Personal observation, St J. Simpson, July 2018.
[35] E.g., Nikolaev 2012: 129, cat. 328 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/99.

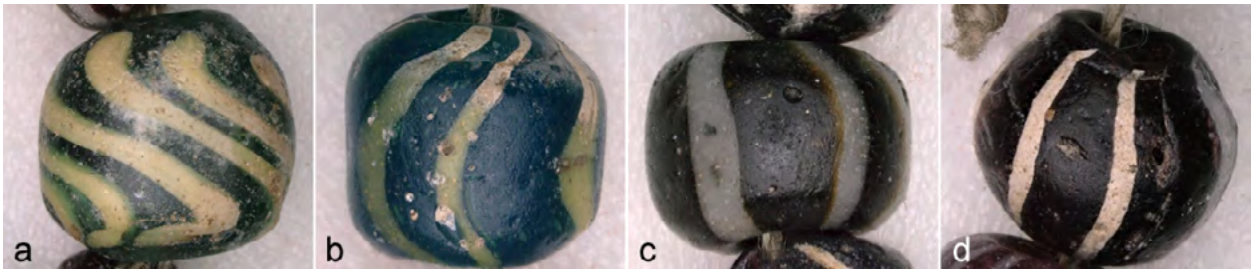

Figure 4. Glass beads, 1st century BC–1st century AD, Znamenka (The State Hermitage Museum, St Petersburg, inv. nr. 2715/98): a–b, two types of blue-green beads with yellow stripes; c, black bead with colourless stripes; d, black bead with white stripes

of this last variety were borrowed for the exhibition, of which six were scientifically analysed. [36] Others were cast in the form of miniature 'amphorae' or seeds and are monochrome: some are colourless but others are light green, light blue, dark blue or purplish brown.[37] 20 of these were borrowed for the exhibition and six were analysed. These first scientific analyses are discussed below.

Striped beads

These are one of two sub-groups of glass beads from the hoard. This type of glass is produced using plant ash. The glass of these beads has relatively high aluminium values (*c.* 5 wt%). Plant ash glasses with high aluminium contents are associated with production in central Asia.[38] The yellow stripes on these beads are coloured and opacified with the addition of tin and lead which combine to form lead stannate crystals (Figure 4a–b). In Europe and the Mediterranean region the use of tin-based opacifiers in glass was mostly restricted to the 2nd–1st centuries BC and after the 4th century.[39] There is growing evidence of the use of tin-based opacifiers in glasses found in central Asia and China during from around 1000 BC onwards.[40]

It has been possible to find typological parallels for the yellow and green beads in examples from Bara in Pakistan, also dating to the 1st century BC–1st century AD. The glasses found there are also of the plant ash, high aluminium compositional type and the yellow glass found is also coloured and opacified with lead stannate. Moreover, the discovery of a large amount of unfinished glass beads at Bara has been used to suggest that this was a production site.[41]

The white/colourless stripes in the black and white beads are not produced with the addition of an opacifier or decolourant (Figure 4c–d). In contemporary European and Mediterranean glass objects, the colourless glasses would be expected to be decoloured with the addition of antimony or manganese, and white glasses opacified with the addition of antimony.[42] The opacity in the Znamenka beads is most likely caused by the presence of quartz crystals and the colourless glass is colourless because it is made using raw materials which do not contribute any strong colours to the glass. The colourless glasses found at the site of Bara also contain no decolourant.[43]

'Amphora'-shaped beads

These are the second sub-group of glass beads to be analysed from the Znamenka hoard. The glass used to produce these beads is compositionally similar to that used to make the bodies of the striped beads. They are also plant ash glasses with high aluminium levels. It is likely that these glasses were produced in central Asia, and potentially at the same site as the striped beads. Like the colourless glass in the striped beads, the colourless glass beads on this necklace do not contain a decolourising agent.

Conclusions

The results of this pilot project and preliminary research already shed new light on the circulation patterns of beads in central Asia during the Scythian and post-Scythian periods. Non-destructive analysis using a combination of scientific techniques has been able to shed light on the origins of the glass beads examined from two sites.

The blue and white 'eye' beads from Aymyrlyg VIII are compositionally similar to many other glasses circulating in the Mediterranean world during the later 1st millennium BC. The glass used to produce them was

[36] Nikolaev 2017: 334, cat. 244 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/102.
[37] Nikolaev 2017: 334, cat. 243 = The State Hermitage Museum, St. Petersburg, inv. nr. 2715/98; see n. 23.
[38] Brill 1999: 342; Liu *et al.* 2012: 2137; Dussubieux and Gratuze 2003: 321.
[39] Tite *et al.* 2008: 82.
[40] Henderson, An and Ma 2018: 99; Liu *et al.* 2012: 2133; Dussubieux and Gratuze 2003: 321.
[41] Dussubieux and Gratuze 2003: 319.
[42] Dussubieux and Gratuze 2003: 317; Tite, Pradell and Shortland 2008: 67–68.
[43] Dussubieux and Gratuze 2003: 317.

made using natron and is likely to have been produced from raw materials in the eastern Mediterranean region. They were found in a late Scythian cemetery in southern Siberia: there was regular contact at this period between this region and the northern Black Sea and Near East but as 'eye' beads are relatively rare in the eastern parts of the Near East, such as Iran, it is most likely they were obtained through contacts with traders in the northern Black Sea. They are therefore part of a wider package of evidence illustrating two-way traffic across the Eurasian steppe between central Asia and the northern Black Sea. How did they arrive in Tuva? Were they worn around the neck of a young woman who travelled east or were they in the bag of a Scythian who bartered or bought them in a Black Sea port? Either is possible but both are more plausible than the idea of a long-distance 'Silk Roads' trader.

The beads from the Znamenka hoard date to a slightly later, post-Scythian, period and one when the Xiongnu (Huns) were starting to dominate the Eurasian steppe. The hoard is not closely dated but conventionally thought to date between about the 1st century BC and 1st century AD, although the excavator did not exclude a slightly later date. The more recent discovery of identical beads at other sites in central Asia support this date, perhaps more closely datable to the 1st century BC. The glasses used to produce the striped and 'amphora'-shaped beads found in this hoard have compositional characteristics which suggest that they were made in central Asia. It is clear that much more work must be carried out before a precise provenance for these beads can be proposed with any certainty but, with the restricted data-set available, Pakistan can be suggested as one possible location for the production of the striped beads.

These preliminary results allow us to catch a glimpse of the vast networks exploited by early nomadic peoples. Bead studies have been dominated by typologies but the widely acknowledged 'bead man', Horace Beck (1873–1941), made it clear that understanding their materials was fundamental to understanding their impact, and his own background as a designer of microscope lenses and interest in early glass-making were fundamental to this. Within central Asia it is now time to build on the pioneering typological analyses by him and E.M. Alekseeva, and develop a new phase of scientific analysis of the personal ornaments of the past.

Acknowledgments

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Petroglyphs of the Scythian period in the Oglakhty mountains (Republic of Khakassia, Russia): new materials and problems of attribution

Elena Miklashevich[1]

Abstract

This paper discusses some issues concerning one of the cultural and chronological phases in the rock art of the Oglakhty mountains (southern Siberia), that of the so-called Scythian period. The author presents some materials obtained over a long period of research, gives an overview of the study and attribution of the Scythian phase of Oglakhty rock art, and publishes some new material from recent investigations. Special attention is paid to a series of scenes with specific Oglakhty images of so-called 'marked' horses which are characterised by their distinctively decorated bodies. Traditionally, these were attributed to the early or developed stages of the Scythian-Siberian 'Animal Style', and there is credible evidence for this. However, some of the horse figures are filled with sinuous lines which are characteristic of the later Tes' culture, and are accompanied by anthropomorphic figures, likewise with Tes' features. More thorough recording of some previously published petroglyphs also shows that they have details which prove that they are of a later date. On the other hand, there is evidence for a connection between this series and earlier cultures of the late Bronze Age. New data raise questions concerning the seemingly most comprehensible and well studied chronological group. There are no unambiguous answers to these questions yet but their presentation should stimulate further research and accumulation of data.

Keywords: Oglakhty; Khakassia; rock art; Tagar culture; Scythian-Siberian 'Animal Style'

Introduction

The Oglakhty mountain range (Figure 1) is one of the best-known places in the Republic of Khakassia for its cultural and natural assets. It is located on the left bank of the Yenisei river (now partly submerged within the Krasnoyarsk reservoir) below the mouth of its right tributary, the Tuba river, and separates the south and central hollows of the vast Minusinsk Basin in the mountains of southern Siberia. Part of the territory is a section of the 'Khakassky' State Nature Reserve and is characterised by a unique combination of mountainous, forest, steppe and coastal landscapes, by the presence of endemic, rare and endangered species of plants and animals, and by unique communities of steppe vegetation. The landscape is literally saturated with the traces of its cultural adaptation during the millennia since the Stone Age, which makes it even more valuable. There are numerous burial mounds and cemeteries of different periods, as well as other types of archaeological heritage of which rock art sites are the best represented.

The rock art is undoubtedly the most important cultural component of the Oglakhty range. The peculiarities of the terrain have provided a huge number of convenient natural 'canvases' to ancient artists: there are red Devonian sandstone outcrops everywhere; and wherever they are, there are images on the rocks. These images are made with all known techniques: pecking, engraving, abrading and painting. They represent all the cultural and chronological periods determined in the archaeology of southern Siberia, beginning with the neolithic period and continuing as late as the ethnographic present. Most of the images are on vertical rock surfaces but others are found on stone blocks lying on the slopes, as well as on slabs used for tomb construction. Rock art sites are scattered across the entire range (Figure 1.4): the richest concentrations are on the riverside cliffs, mostly now below the waters of the Krasnoyarsk reservoir but fortunately recorded before the flooding, and on the southwest slope of the Sorok Zubiev ('Forty Teeth') mountain. The known rock art sites – currently 14 – together form the largest rock art complex of the Minusinsk Basin. This is acknowledged to be one of the world's richest rock art areas and this complex is of exceptional value in terms of its coverage of chronological periods, diversity of styles, high artistic qualities, and representativeness of the repertoire of images and subjects.[2] Of great importance is the fact that the rock art sites can be correlated with other archaeological sites in the same territory, many of which have been excavated, and the imagery on slabs from kurgan constructions, especially from excavation, is of great help in the attribution of the rock art depictions.

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[2] Miklashevich 2015; 2016.

Figure 1. Complex of rock art sites in the Oglakhty mountains: 1–2, location of Oglakhty; 3, general view of the massif from the southeast; 4, Oglakhty, yellow dots showing rock art concentrations, orange dots showing locations of rock art of the Scythian period (based on Google Earth)

The first data about rock art in the mountains of Oglakhty appeared in scholarly literature of the 18th century, and the first drawings of the images were published in the 19th century. Throughout the 20th century, numerous researchers were involved in investigating the area and copying its rock art. Two of them should be noted above all: A.V. Adrianov, who in 1907 made paper squeezes of hundreds of petroglyphs on the riverside cliffs and on the Sorok Zubiev mountain;[3] and Ya.A. Sher, who in the 1960s carried out recording of the petroglyphs on the riverside cliffs before they were flooded as a result of the impounding of the Krasnoyarsk hydroelectric power station reservoir.[4]

In recent years, study of the rock art of the Oglakhty range has become reactivated, both in terms of field investigations and the search for new sites, as well as the application of new methods of retrieving information from the known sources. Discovery of new concentrations, panels and images, and their documentation in accordance with modern requirements and capabilities have led us to make important corrections in the cultural and chronological attribution, style, iconography and semantics of rock art imagery, and sometimes a complete revision of existing concepts. In this paper we will show this through the example of one of the cultural and chronological phases in Oglakhty rock art. New data obtained from the investigation of the complex in recent years have raised some questions concerning the seemingly most comprehensible and well-studied chronological group – that of the so-called Scythian period. There are no unambiguous answers to these questions yet, but their presentation should stimulate further research and accumulation of data.

Rock art of the Scythian period in Oglakhty: a brief overview of the imagery and its research

At least a thousand panels and slabs with rock art and many thousands of individual images are known in Oglakhty. A large number of cultural and chronological groups from the Stone Age to the ethnographic present are distinguished on the basis of this material,[5] but special mention must be made of the group attributed to the Tagar culture of the Scythian period in the Minusinsk Basin. However, there are not too many images known from Oglakhty which are rendered in the Scythian-Siberian 'Animal Style'. This is despite the fact that numerous kurgans of the Tagar culture, both of its early (Podgornovo) and later (Saragash) phases, are scattered throughout the territory in the foothills of the mountains and adjacent steppe, and that on the neighbouring mountains of Tepsei and Sukhanikha (both on the right bank of the Yenisei) such rock art imagery is well represented.

However, a series of images, mostly deer, were recorded in the southern part of Oglakhty at the sites of Sorok Zubjev, Chyortov Log and Kizan (Figures 2.1–4, 7–8, 10; 3). They are presented in some distinctive poses: the so-called 'sudden-stop pose' when the legs are slightly stretched forward, and when the legs are bent under the belly. The figures are done in outline and the body, especially the hip, is decorated with spiral helixes, sometimes with vertical lines. The body is lean, often of subtriangular shape. A magnificent antler is shown with a number of branches bending backwards and always with two lower parallel branches pointing forward. The dating of these images is based on their stylistic similarity to well-known objects of portable art and images on artifacts from the Scythian period of Eurasia. It should be noted that almost none of the Oglakhty figures from this series literally reproduce any object or complex of iconographic features known from portable art. Here we can only see some discrete traits (like a spiral on the hip, the shape of the body, the 'sudden-stop pose', the manner of rendering antlers, etc), which remind us of classical images of the Scythian-Siberian 'Animal Style', yet do not copy them. Most of these petroglyphs are a homogeneous series, possibly even made by a single individual. It is also quite possible that some were pecked in later periods as imitations.

Another group is represented by images of horses (Figures 2.5–6, 9; 3), which have much in common with the images of deer described above, but also have their own peculiarities. Among them there are both outline images with helixes on the hip and silhouettes. They look more stylised than the deer, their legs are more stretched forward, their bodies even leaner, and the body decoration is more 'geometric'. Among the iconographic features one should first note the tail, rendered as a thin line, bent at a right angle, with its tip sometimes shown in the form of a loop. The hooves and pointed withers are emphasised, and the mane is occasionally shown. Some of the images in this group are stylised in such a way that they resemble a dog-like predator rather than a horse, while maintaining the general iconography of the image. In one composition the horse is led by an anthropomorphic male with a long torso, bent legs, a battle-axe in one hand and wearing a distinctive Scythian pointed headdress (Figure 3). The scene connects this group with the one described below.

In Oglakhty there is (or was, as most now are lost) a representative series of unusual images of ornamented horses (Figure 4), which is a sort of hallmark for the whole rock art complex. These are large outline figures decorated with intricate body patterns in the form of

[3] Adrianov 1908.
[4] Sher *et al*. 1994.
[5] Esin ed. 2017; for the chronological consequence see Miklashevich 2015: fig. 16.

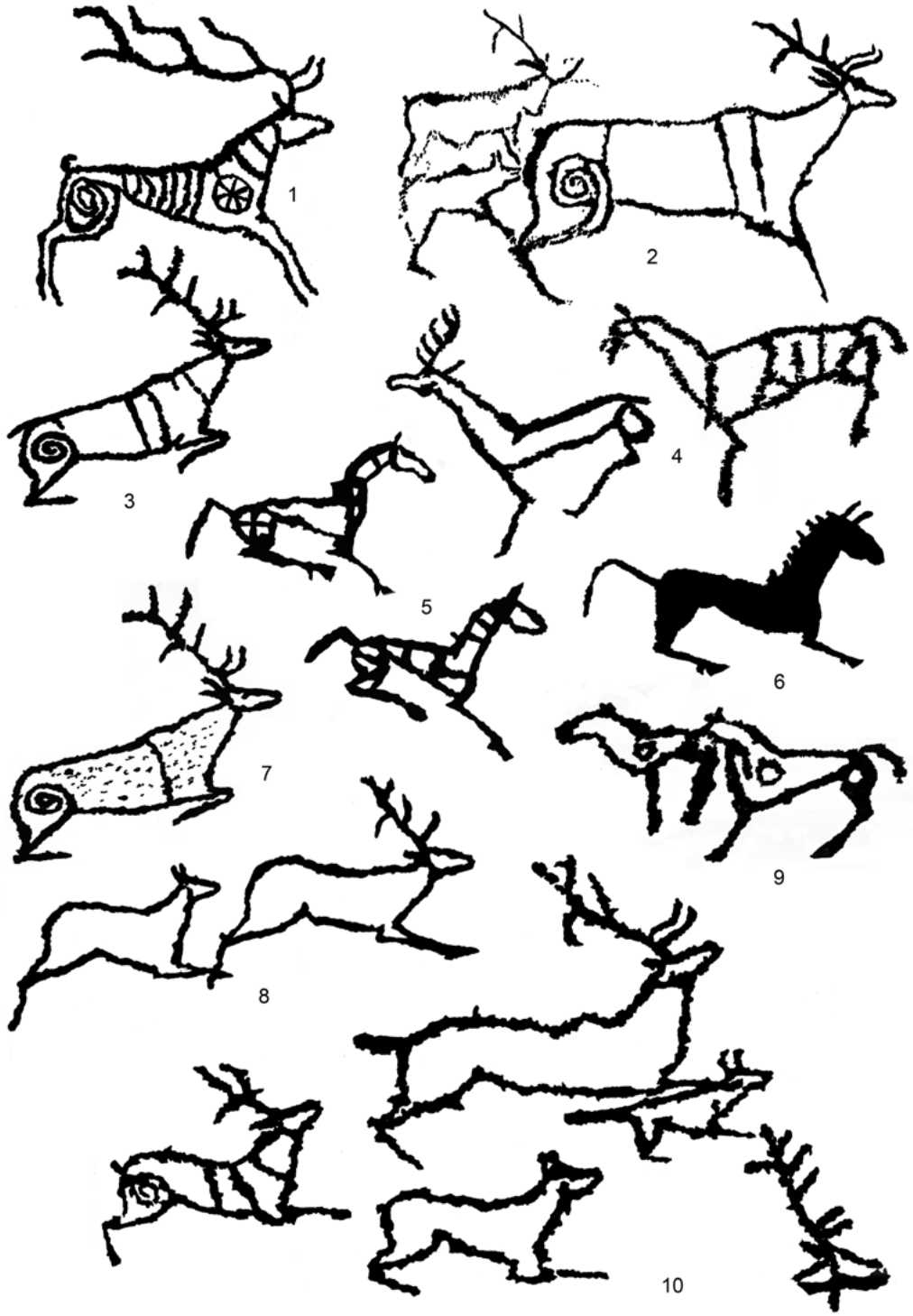


Figure 2. Rock art of the Scythian period from various sites in Oglakhty: 1–7, Sorok Zubjev; 8–9, Chyortov Log; 10, Kizan (1, 3, 7–8, 10, after Sovetova 2005; 2, 4–6, 9, tracings: author)

zigzags, winding lines, cells, triangles and dots etc. On the hips there are signs in the form of oblique crosses or wheels with spokes. Their tails are shown in the same way as the images of the group described above: a thin line bent at a right angle and often with a loop on a tip. The muzzle is drawn in a very distinctive way: in many of the figures (Figures 4.1, 3–4, 7) it resembles the head of a well-known image in Scythian art, the so-called 'beak-headed deer',[6] rather than a horse-head. Sometimes it looks like the head of an elk. The ears are shown as two parallel lines directed forwards; the round eye adjoins the forehead line or even rises above it. Many of the horses have a mysterious triangle inside their muzzles, remarkably reminiscent of the tongue shown between the teeth in rock art images of wild boars and wolves

[6] Cheremisin 2008*b*.

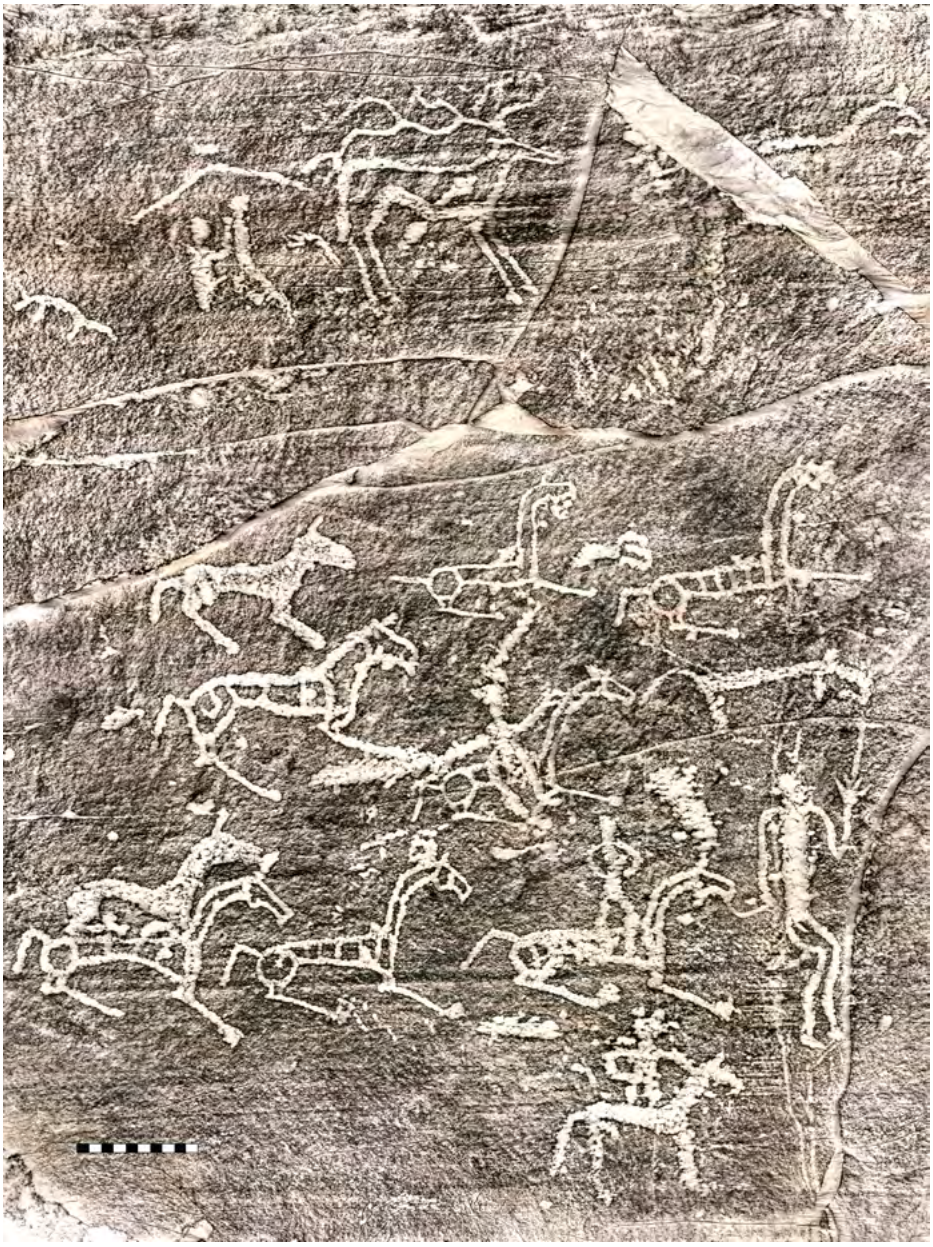


Figure 3. Oglakhty Sorok Zubjev. A composition with images of horses, deer and a 'Master of horses'. Rubbing on Mikalent paper

in the Scythian period.[7] There are exceptions as well: some of these animals are silhouettes, and others are occasionally represented in this style too. The story-line of the scenes is not clear: horses are mostly shown by themselves, in groups, in pairs or alone. And only on one panel can one see an archetypical scene, well known in the ancient art of Eurasia, the so-called 'master of horses':[8] an anthropomorphic male with bent legs, wearing a distinctive Scythian pointed headdress stands between two saddled horses which face each other, and holds each by its reins in either hand (Figure 4.1).

This series of images is an outstanding and extremely interesting phenomenon in the rock art of the Scythian period of the Minusinsk Basin. While petroglyphs in the Scythian-Siberian 'Animal Style', decorated with spiral helixes are found everywhere at numerous sites of the region (including Oglakhty), the images of such horses with intricately ornamented bodies occur only at this place.[9] Most were concentrated on the riverside cliffs, and some are now underwater, while others are irretrievably lost but before flooding they were clearly visible from boats sailing along the Yenisei and

[7] Miklashevich 2008: fig. 9.37.
[8] Sher 1993.

[9] There are few exceptions: one exactly the same scene with the 'master of horses' has been found on Kunya mountain (Sovetova 2006) and several more or less similar figures of horses are recorded on the rocks and slabs of the Tepsei/Ust-Tuba complex (Sher 1980: fig. 83; and other sources). The sites are located in the immediate vicinity of the Oglakhty – Kunya is a few km upstream, and Tepsei/Ust-Tuba is opposite on the right bank of the Yenisei. These exceptions only confirm that Oglakhty was the main area of concentration of such images.

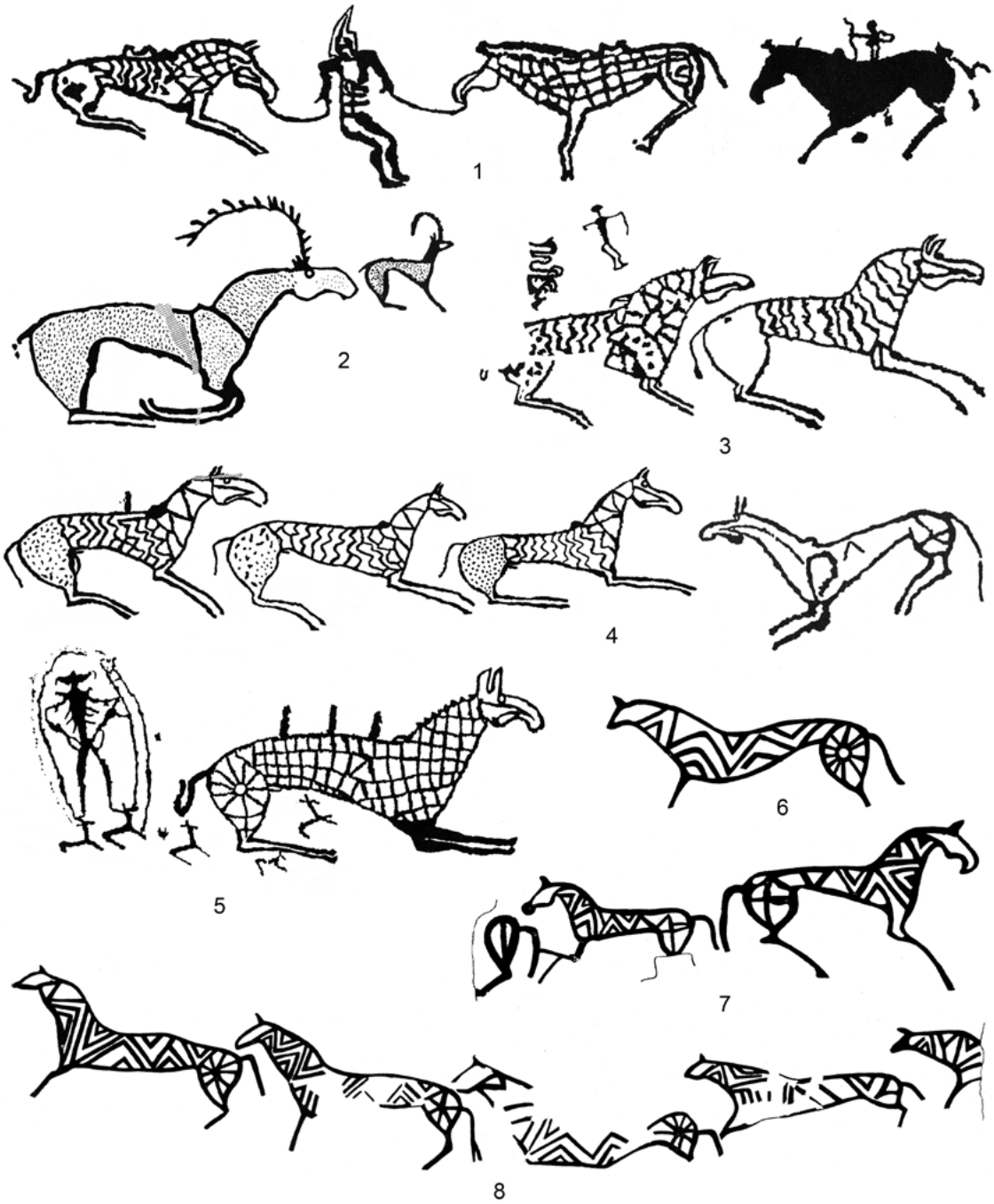


Figure 4. Scenes with 'marked' horses in a specific Oglakhty style, from various sites: 1–5, riverside cliffs (Oglakhty I after Sher *et al.* 1994); 6–8, Apkashev (after Chlenova 1981*b*); 9, 12, riverside cliffs (tracings: author); 10, Badalazhkin Log (Oglakhty III after Sher *et al.* 1994); 11, Badalazhkin Log (after Sovetova 2005); 13, Chyortov Log (after Sovetova 2005)

from the path under the cliffs. It was these sizeable unusual artistic images which attracted the attention of travellers, researchers and antiquity lovers. We can see them in the first drawings of Oglakhty rock art,[10] not always identified by artists as horses, but always recognisable because of their distinctive style and iconography, no matter how conventional the drawing was. The uniqueness of these images also caused the first attempts at semantic interpretation.[11] Of course, these have no scholarly value now and are only of interest for the history of research as the interpreters of that time had no idea even of the approximate age of these petroglyphs, not to mention everything else. Nevertheless, the very first attempt at dating is worth a closer look.

[10] Spassky 1857: table IV; Savenkov 1910: table V: *XIII, XIX*; VII: *I*; Appelgren-Kivalo 1931: figs 133–34, 138.

[11] Savenkov 1910.

In 1923, the Finnish archaeologist Prof. A.M. Tallgren delivered two lectures at the University of London on the theme of 'Inner Asiatic and Siberian Rock Pictures'. In those lectures he successfully demonstrated a method of dating petroglyphs by comparison with archaeological objects and images on them: 'We can in a few cases arrive at somewhat more precise dates if we connect the forms of tools and figures depicted, with similar antiquities found in cultural regions of Siberia which can be dated'.[12] As the most illustrative example, he compared the drawings of ornamented horses from Oglakhty, which were taken in 1887 by the participants in the Finnish expedition to the Minusinsk Basin, led by J.R. Aspelin (Figure 5.1–3) with an image on a copper alloy celt from the Tovostin collection, an occasional find from the Minusinsk Basin, acquired later by Finland (Figure 5.5–6):

> 'The zebra-like figures of horses, represented in openwork style on the Aglakty [sic] rock are met with in the antiquities of Siberia of the Hellenistic period. In hoards of this period (200 B.C.–100 A.D.) Chinese mirrors of the Han dynasty and Hellenistic weapons occur. There is also however, a socketed bronze axe with an ornamental, openwork horse figure, executed by casting'.[13]

Tallgren was mistaken in the dating of the celt. Later, N.L. Chlenova, who again used this analogy to date the ornamented horses of the Apkashev rock art site (also located on the riverside cliffs of Oglakhty), which she discovered in 1958 (Figures 6–8), attributed the celt to the 6th or beginning of the 5th century BC.[14] Taking into account the difficulties of dating occasional finds – practically all of the Tagar celts are such – and recent significant changes in ideas about the chronology of the Tagar culture, it is quite possible that this date might be revised. But in general, it is worth noting that this remarkable analogy chosen by Tallgren still remains perhaps the only solid basis for the dating of Oglakhty ornamented horses, whatever the date of the celt itself.

With the accumulation of new data, new possibilities have appeared for the analysis of this series of images. In the 1960s, a rescue expedition led by Ya.A. Sher recorded more than a hundred panels on riverside cliffs of Oglakhty before their flooding; they included compositions with images of this series.[15] That constituted good representative material for analysis. Sher, who identified the Arzhan-Mayemir phase of the early stage of the Scythian 'Animal Style' in the rock art of Asia (assuming its date as 8th–7th centuries BC),[16] considered it possible to attribute the Oglakhty series to this style. He wrote that they have all the traits of the images on the deer-stone from the kurgan of Arzhan, such as 'the outline of a lean body, head and legs; the shape and position of an eye and ears, a prominence of the withers', while the decoration of the body was a local Minusinsk feature.[17] N.L. Chlenova attributed the ornamented horses of Oglakhty to the end of the 6th–5th centuries BC due to their similarity with the image on the above-mentioned celt, as well as with zigzag patterns and figures on the knives of the Tagar culture and because the images of 'Scythian-type' cauldrons occurred together with similar horses at the Apkashev rock art site.[18] In the 1970s and 1980s, the petroglyphs of Oglakhty were investigated by an expedition from the University of Kemerovo, led by B.N. Pyatkin. New locations were discovered and hundreds of panels were recorded in areas which had not been flooded. The series of ornamented horses, as well as of petroglyphs of the Scythian period as a whole, was significantly enhanced. On the basis of the collected materials, O.S. Sovetova carried out a special thematic study entitled 'Petroglyphs of the Tagar Epoch in the Yenisei (subjects and images)',[19] in which she paid great attention to the petroglyphs of Oglakhty, including the images of the 'marked' horses (as she named them), to which she had earlier devoted a special publication.[20] The main objective of her study was to analyse content and semantics, so the problems of dating this series and its correlation with other petroglyphs of the Tagar culture were not specifically considered. She accepted Ya.A. Sher's opinion that 'marked' horses belong to the early stage of the Scythian 'Animal Style' (8th–7th centuries BC), while images decorated with spiral helixes belong to the developed phase (6th–4th centuries BC).

Thus, the 'Scythian stratum' in the rock art of Oglakhty is well known in archaeology, has been studied by many researchers and is quite well published. Its attribution to the Tagar culture has been accepted *a priori* and has never been questioned, and the possibility of correlating certain stylistic groups with this or that stage of the culture was never considered. We shall return to this issue below but, in the meantime, we will present some recent related discoveries of rock art images in the Oglakhty mountains.

Recent discoveries

We made a systematic study of Oglakhty petroglyphs in the early 1990s and resumed this investigation in 2014. Now a complete survey of the mountain massif is being carried out with the purpose of finding all

[12] Tallgren 1933: 206.
[13] Tallgren 1933: 206.
[14] Chlenova 1981*b*: 86.
[15] Sher *et al.* 1994: Oglakhty I: *10, 14, 21, 45, 56a, 100*; Oglakhty III: *5*.
[16] Sher 1980: 243–49.
[17] Sher 1980: 245.
[18] Chlenova 1981*b*: 86–87.
[19] Sovetova 2005.
[20] Sovetova 1987.

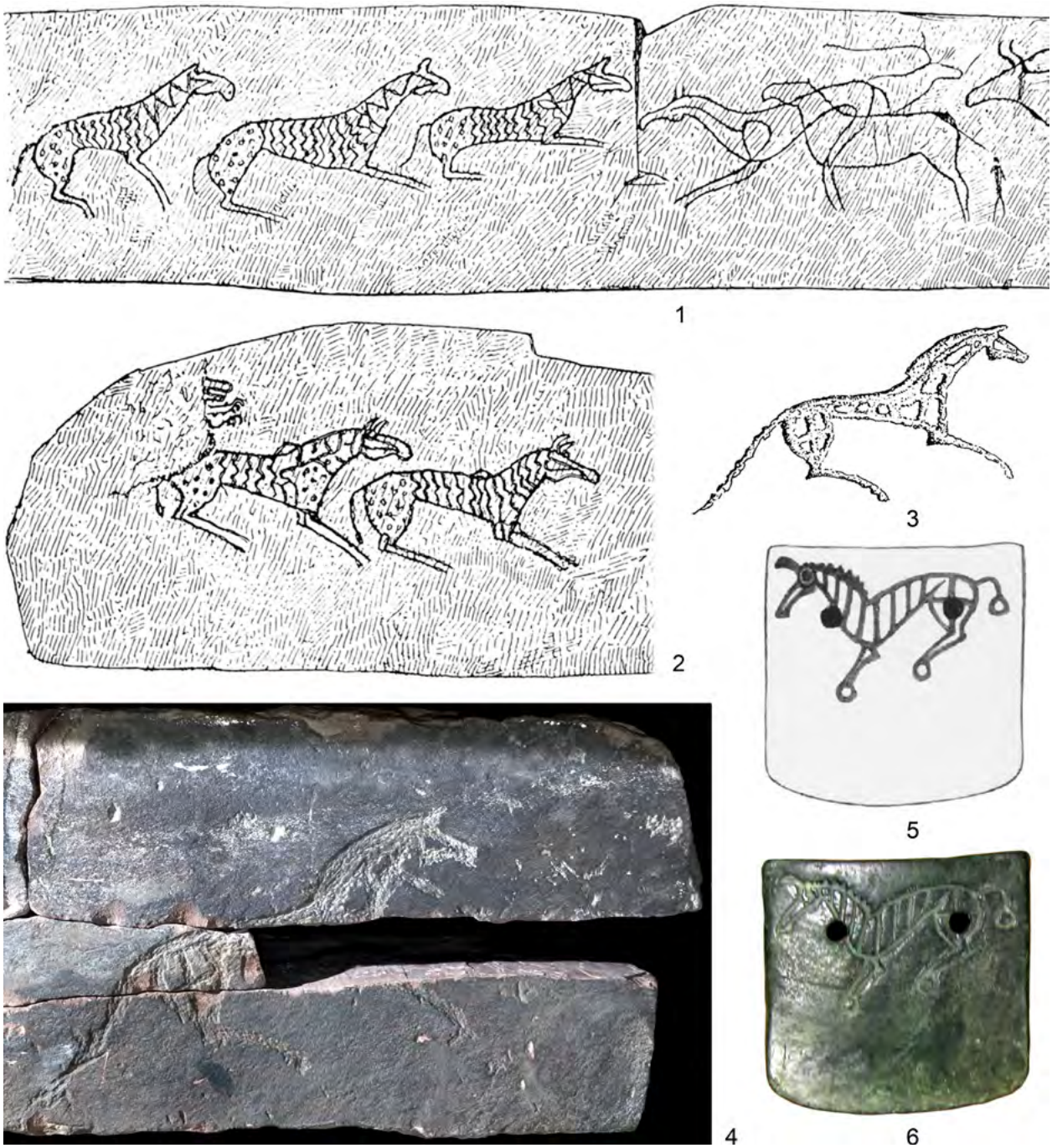


Figure 5. First attribution of 'marked' horses of Oglakhty: 1–3, drawings made by the Finnish expedition of 1887 (after Appelgren-Kivalo 1931); 4, fragments of original rock with the horse image in Abakan museum (photograph: L. Bove); 5–6, copper alloy celt with horse image in the same style, chance find from Minusinsk Basin, Chounéry village (5, after Tallgren 1933; 6, Museovirasto, Helsinki, Tovostin collection, inv. nr. Tov.53, photograph: S. Narylkov)

the sites and producing an archaeological map of the area, documenting revealed rock art sites and re-documenting known ones using modern methods and technologies. As usual, a thorough inspection has brought discoveries both of new sites and new panels at known locations, as well as new images and details on known panels. A number of locations have been found in recent years in the internal ravines of the massif. Some of them, as was revealed by the archival data, were known to other researchers before, but they had not been fully examined and documented. At two locations interesting images of the Scythian period have been revealed.[21]

Oglakhty Abrashkin Log

The ravine (*log*) called Abrashkin is one of the largest in the southern part of the Oglakhty range, stretching

[21] Miklashevich 2017.

almost 5 km from the northwest to the southeast (up to the coastline). The northern side of the ravine is a chain of hills, the southern slopes of which consist of several levels of rocky outcrops. The first mention of petroglyphs in the Abrashkin Log was by L.R. Kyzlasov, who discovered several panels in its northwest part and noted that 'there are a huge number of rock art images here which should be studied carefully and permanently'.[22] Examination of this and adjacent parts of the ravine has already revealed more than 30 decorated panels, although so far only checked about half of its length. Among the newly discovered panels there are remarkable scenes with images which can be attributed to the Tagar culture on the basis of their style and the similarity of particular details with portable material culture decorated in Scythian-Siberian 'Animal Style' and images on slabs from Tagar kurgans. Some of these are now discussed here.

One panel bears a large multi-figured composition (Figure 6), which was clearly created not at once, but nevertheless in a single period. Here outline figures of deer, ibexes and other ungulates are depicted, as well as predators, all decorated with helixes. When the eye is shown, it adjoins the contour of the forehead. Some animals are shown with bent legs, others are standing. Some of the standing animals are shown with four legs, while others have two. There are also anthropomorphic figures, including one with a large sigmoid bow. These seem to be later additions to the basic composition, just as on a neighbouring panel with deer (Figure 7); moreover, there are more examples of roughly pecked anthropomorphic figures on some small panels around this group. As for the main composition – with animals – it was created, in our opinion, in the following way. First, three major figures in the centre of the panel were pecked (they are shown in black in the tracing (Figure 6): two deer facing left and an undefined animal opposing them (its head resembles a wolf but its legs have hooves; the tail is missing). After that, the unfinished middle-sized figures of a deer and an ibex were added (shown in green on the tracing). The deer's hip overlaps the hip of the deer from the initial group, and the pecking of the deer and the ibex is the same. In the next stage, the remaining free parts of the panel above and below-right were completed with minor graceful images of ibexes, deer and predators (shown in brown on the tracing). These images were made with a different tool; the pecking is fine and more detailed. Interestingly, the large helixes above the front legs of the two ibexes are filled not just with a silhouette pecking, but with rows of tiny helixes which merge. One of these ibexes overlaps the deer from the second layer. Unfortunately, we did not succeed in tracing all the details as the rock surface is quite friable and has undergone considerable weathering over the subsequent millennia.

[22] Kyzlasov 1973: 40.

At the foot of the next hill, another panel was found: although crumbling, something unexpected was revealed after clearing off the lichen (Figures 8.1–2). Here there was a major outline figure of a predator with the tip of its tail bent upwards, with spiral curls on the body and a leonine head. Another animal of undefined appearance is in front and, judging by the fact that it is held with a cord by a man drawn between it and the lion-headed predator, this must be a horse. The manner of depicting this image is very similar to the figures of the first layer on the panel described above. The pecking of all three images is identical, so it is definitely a unified scene.

The images of animals decorated with helixes in Abrashkin Log clearly represent what Ya.A. Sher described as a developed stage of the Scythian-Siberian 'Animal Style' in rock art,[23] and can possibly be attributed to the Saragash phase of the Tagar culture. They have stylistic parallels with other rock art sites of the Minusinsk Basin although at the same time they differ from images of the same period found at other locations at Oglakhty (compare with Figure 2). It is not quite clear how this can be explained but may relate to the individual methods of the ancient artists.

It is worth emphasising that neither scenes of confrontation between predatory and ungulate animals nor the image of a lion-headed predator have ever been found in the rock art of this region. However, the image of such a predator has numerous analogies in the portable and rock art of the Scythian period in Eurasia. Decorated metal objects are known from the Minusinsk Basin itself (Figure 8.3).[24] A predator, which has not only a lion's head, but also the helixes on its body, is shown on a gold foil application from the Karashoky cemetery (Figure 8.4)[25] and on a rock in the Chu-Ili mountains (Figure 8.5),[26] both from Semirechye in Kazakhstan. The predator from Abrashkin Log does not copy these parallels. Firstly, the perception of the image is hindered by inanimately depicted long thin legs instead of mighty clawed paws. The impression is that the artist reproduced an image which he did not know well. Obviously he could not see a lion in the mountains of Oglakhty, but here and in the other examples the animals depicted are not real, but a generalized image of a predator; and in this case we mean that the author of the depiction in Abrashkin Log was not very familiar with this image on portable art or any other original. However, the outline of a body, helixes and the head are rendered confidently, skillfully and with knowledge of the style. For clarifying the dating of the petroglyphs

[23] Sher 1980: 249–51.

[24] This object originates (just as the decorated celt) from Tovostin's collection purchased to Finland (Tallgren 1917: pl. IX: 16). It is an a chance find. We present here a photograph of it, which was taken in Helsinki by S.G. Narylkov and was kindly given to us.

[25] Beisenov 2013*b*.

[26] Rogozhinsky 2016: fig. 295.7.

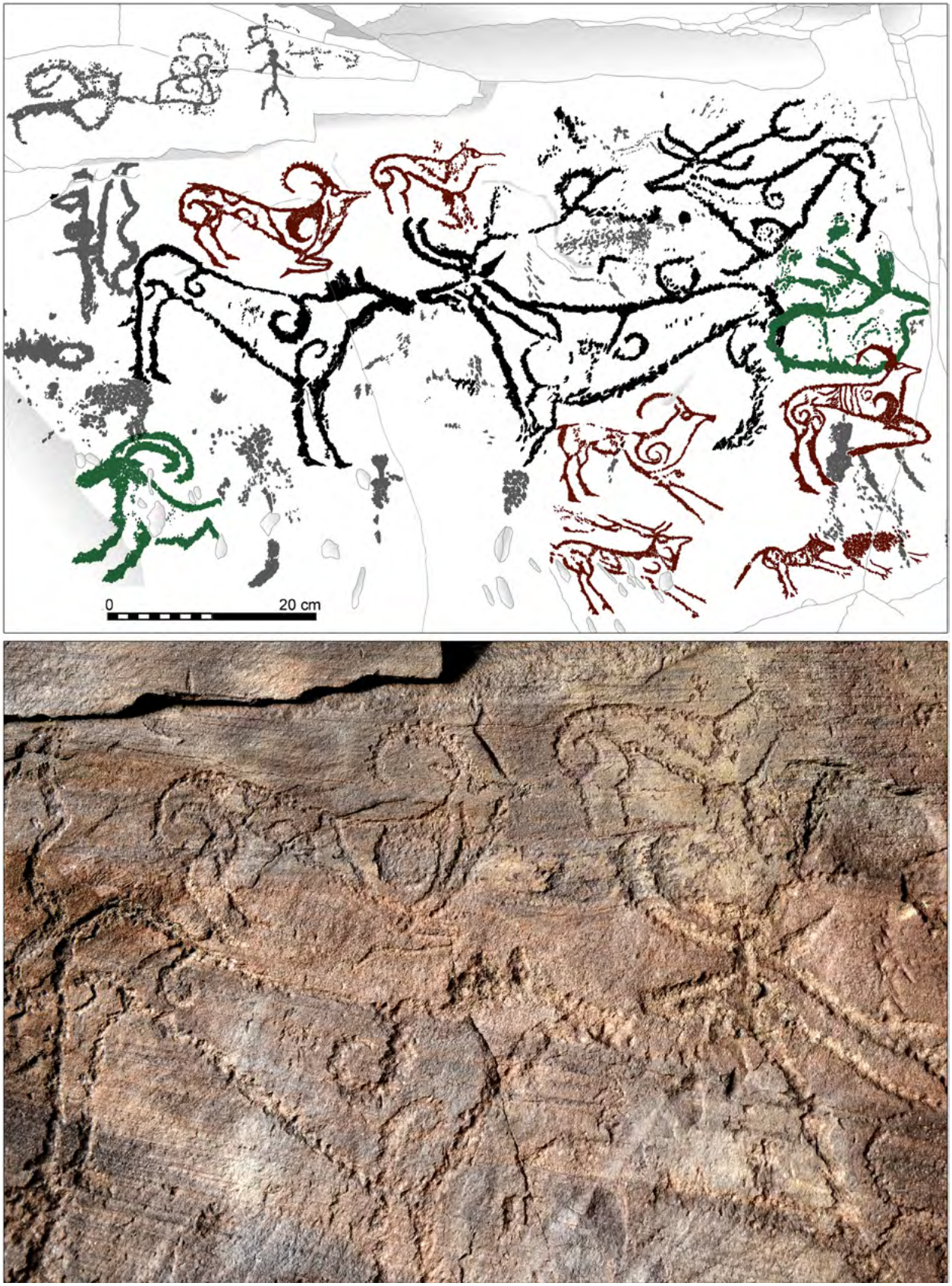


Figure 6. Oglakhty, Abrashkin Log, multi-figure composition, recorded in 2015, and its fragment
(tracing: author; photograph: L. Bove)

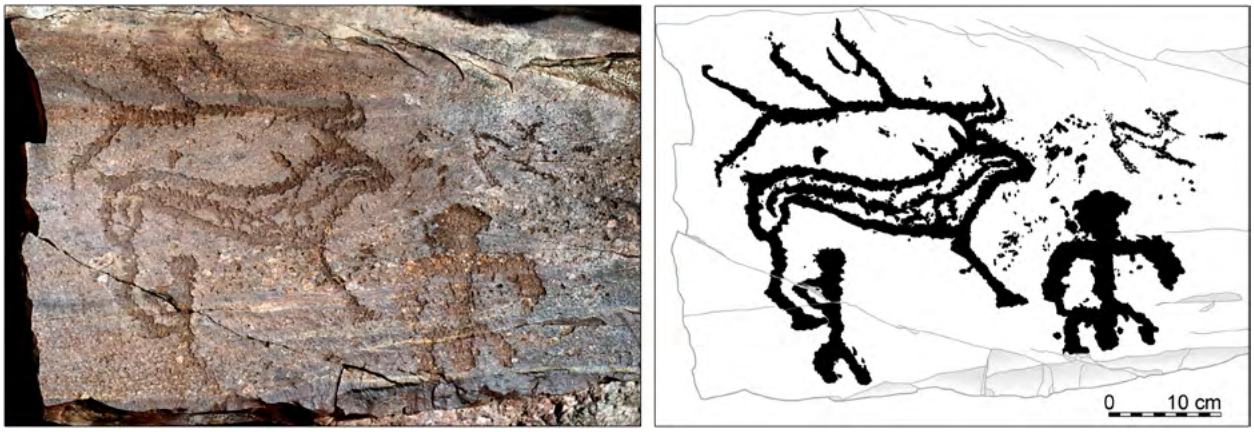


Figure 7. Oglakhty, Abrashkin Log, panel with a deer, recorded in 2015
(photograph: L. Bove; tracing: author)

recorded in Abrashkin Log, these analogies are of little help as they have a wide date-range: the predator from Karashoky date to the 7th–6th centuries BC, that from Chu-Ili between the end of 4th and beginning of the 2nd centuries BC, and the one from the Minusinsk Basin to the 4th–2nd centuries BC.[27]

Perhaps further investigation of the territory of Oglakhty and new discoveries will help to clarify the issues arising in connection with the attribution of these images. A more representative selection of images would allow us to draw more confident conclusions than the analysis of sparse finds. However, in any case, the new petroglyphs from Abrashkin Log have significantly complemented the 'Scythian stratum' of Oglakhty rock art.

Oglakhty Badalazhkin Log

Badalazhkin Log is also located inside the southern section of Oglakhty, starting from the shore, where it divides the locations of Oglakhty I and II according to the inventory of Ya.A. Sher.[28] The images of this site are concentrated on the rocky outcrops of the ravine's northern side, which actually is a mountain slope. A new survey has shown that the location of Oglakhty III found in Ya.A. Sher's 1968 expedition[29] and the location of Oglakhty VIII found in B.N. Pyatkin's 1983 expedition[30] are the extreme points of the same location, which is named 'Oglakhty Badalazhkin Log' according to our new inventory. It is noteworthy that both known locations contained remarkable compositions with images of 'marked' horses (Figure 4.10–11). Between the two points a few more panels have been discovered recently, and among them there are scenes with similar horses. One depicts two outline figures of horses facing each other and their bodies filled with winding lines and zigzags. There are also two schematic anthropomorphic figures wearing high headdresses (Figure 9.1–2). On the other panel two outline figures of horses are depicted one above the other and both facing right. Their bodies are filled with intersecting straight lines (Figure 9.3). There are also some single figures, which are more schematic and lack body decoration.

These depictions are immediately recognisable as part of the large series of Oglakhty 'marked' horses described above. However, despite their similarity to other images of the series, we have observed that the Badalazhkin horses are decorated with less regular zigzags, cells, triangles and 'solar signs' on the thigh than the classic images on the riverside cliffs. In particular, the central horse on the first panel, which has a head depicted in classic fashion with a beak-like muzzle, with a triangle inside and with parallel ears stretched forwards, the body filled with winding lines which are more reminiscent of the so-called 'labyrinth' and decoration of the animals' bodies in the imagery of the Tes' culture,[31] which is dated between the end of the 3rd century BC and beginning of the 3rd century.[32] Other figures have distinctly different decoration of the body and correspond much less to the canon in general. Anthropomorphic figures also show some features inherent in those depicted on the slabs of the Tes' kurgans. Moreover, they neither hold the horses with reins, nor stand between them, and their role in the whole scene remains unclear. This observation caused us to review the entire series of images of 'marked' horses which had previously been believed to be early Scythian.

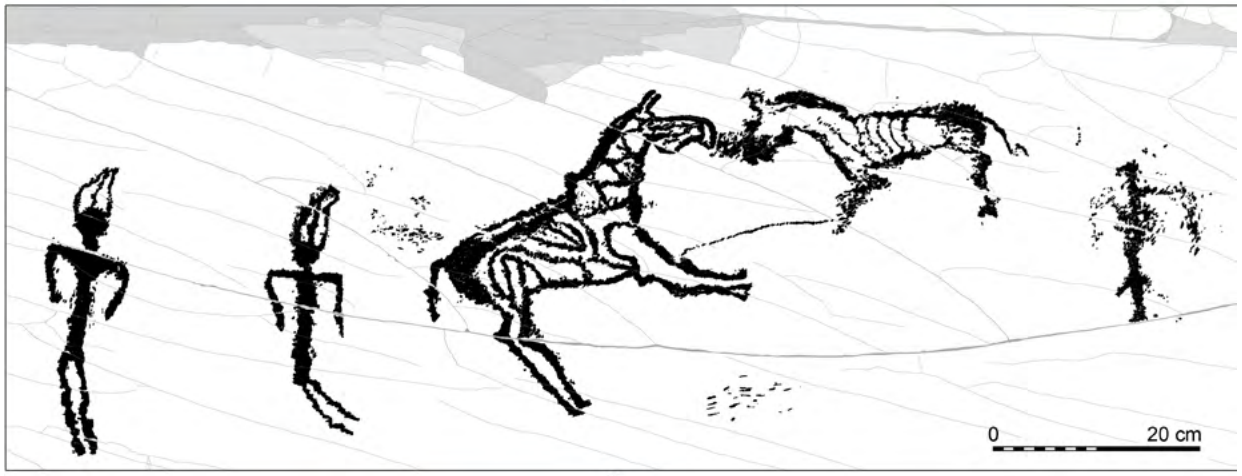
Problems of attribution of the 'marked' horses of Oglakhty

Firstly, we noted that on the other panel from Badalazhkin Log (Figure 4.11) and on the panel at the

[27] Beisenov 2013*a*; Rogozhinsky 2016: 67; Bogdanov 2006: 63.
[28] Sher *et al.* 1994.
[29] Sher 1980: 158, fig. 91; Sher *et al.* 1994: Oglakty III.
[30] Sovetova and Miklashevich 1999: 50; Sovetova 2005: figs 13, 30A.
[31] Sher 1980: fig. 123; Savinov 1995; Rusakova 2016; and others.
[32] Kuzmin 2011.

Figure 8. Oglakhty, Abrashkin Log, composition with a lion-headed predator, recorded in 2015, and parallels for it: 1, Photograph: L. Bove; 2, tracing: author; 3, bronze object, chance find from the Minusinsk Basin, Beiskoje village (Museovirasto, Helsinki, Tovostin collection, inv. nr. Tov. 388; photograph: S. Narylkov); 4, golden foil cutout, Karashoky cemetery, Kazakhstan (after Beisenov 2013*a*); 5, rock art image in Chu-Ili mountains, Kazakhstan (after Rogozhinsky 2016)

1



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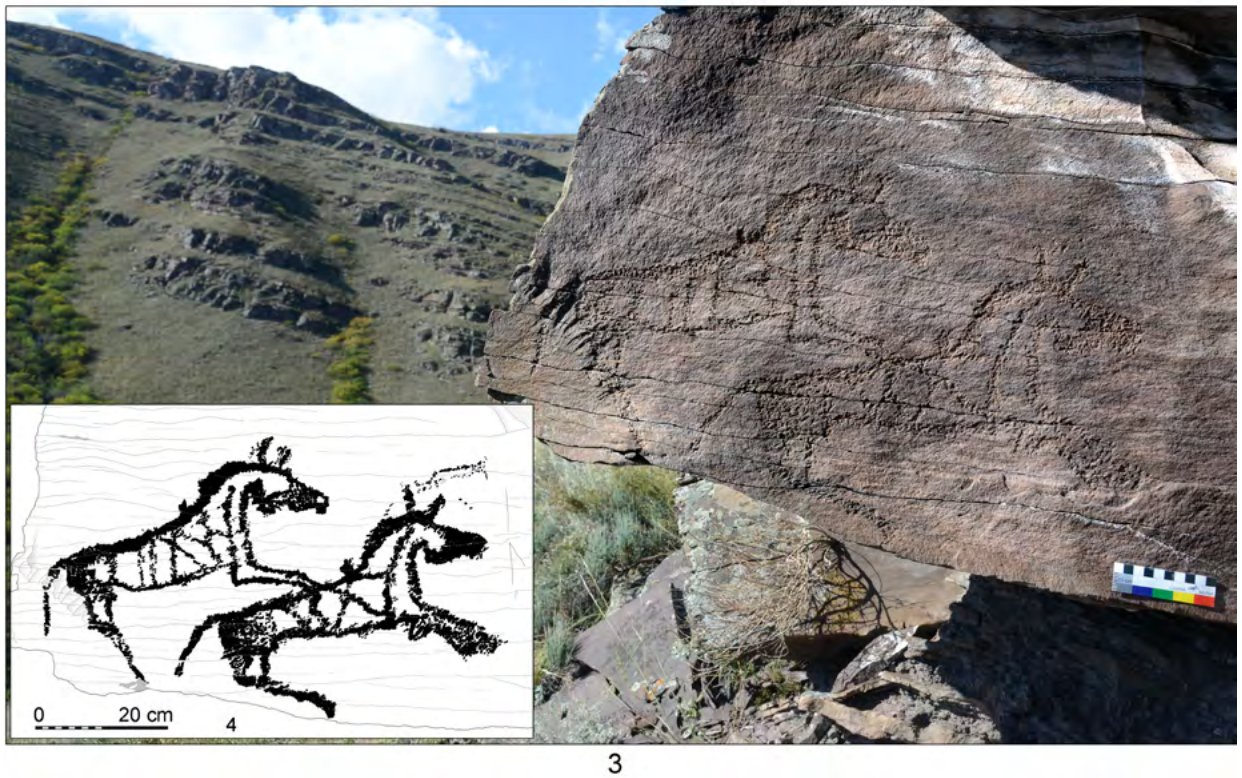

3

Figure 9. Oglakhty, Badalazhkin Log: compositions with 'marked' horses, recorded in 2016 (photograph: L. Bove; tracing: author)

site of Chyortov Log (Figure 4.13) the same 'labyrinths' are depicted on the bodies of horses, although there are also regular cells and canonical features such as a 'beaked' muzzle, a triangle within, a tied tail loop and 'sudden-stop pose'. In the first composition, one of the horses superimposes the anthropomorphic figure, the attribution of which is unclear, but the way of showing the shoulders resembles the Tes' figures.

The next step taken was to conduct a source analysis of the panels on which the early Scythian attribution of the series was based. The purpose of this was to see if the details had been correctly copied, that nothing important been missed, to compare the technique of rendering different images and to find superimpositions in order to establish the sequence of creating the composition and to reveal which images on a panel are synchronous and which are not. We have previously demonstrated numerous examples of how careful re-documentation often reveals significant details, and these change – sometimes dramatically – our understanding of a particular piece of rock art. Unfortunately, in this case the re-documentation is almost impossible as the majority of the most expressive scenes with 'marked' horses were located on the riverside cliffs and were lost after the flooding of the Krasnoyarsk reservoir. Nevertheless, it is still possible to re-analyse some of them as various museums have squeezes and photographs made at Oglakhty by A.V. Adrianov,[33] photographs taken in the 1960s by Y.A. Sher, and fragments of rocks removed before the flooding. Examination of these materials shows that the tracings of the published images are not always accurate, and therefore some significant details were not taken into account in their analysis.

Let us take as an example one of the compositions from the riverside cliffs of Oglakhty (Figure 10). There are the following sources for its reconstruction:

- a drawing made during the expedition of J.R. Aspelin;[34]
- a squeeze taken by A.V. Adrianov in 1907;
- fragments of the original rock which was split up by A.N. Lipsky in 1966.

A tracing published by Ya.A. Sher[35] was probably made using Adrianov's squeeze, because when in 1968 the expedition started copying the petroglyphs of Oglakhty, A.N. Lipsky had already destroyed several panels and removed the surviving fragments from the site. Fragments of this panel, now in storage in the Khakassia National Museum in Abakan, were recently joined by L.L. Bove and A.S. Tekhterekov (Figure 10.3). Although some very important parts are unfortunately lost by using photographs of the surviving parts we have succeeded in making a detailed reconstruction (Figure 10.4), while the missing portions were traced using photographs of Adrianov's squeeze which is held in the Museum of Anthropology and Ethnography (Kunstkamera) in St. Petersburg (Figure 10.1). Many details were clarified (compare Figures 4.3 and 10.4), the presence of engraved sketches for the images of horses was revealed, schematic anthropomorphic figures on the right were added, and the anthropomorphic figure above the horses was clarified, but the most important and unexpected event was the discovery of the image of a predator in this composition. One can still see some wavy lines over the croup of the left horse in the drawing by the Finnish expedition (Figure 5.2), and they are also shown in the tracings by Ya.A. Sher, but apparently because of the fragmentary nature of this image, they were not understood. On the squeeze, which is an accurate impression of the rock surface, it can clearly be seen that there is a muzzle with an open mouth, and the front paws with claws (Figure 10.1–2) of a predator, depicted in a very recognisable stylistic manner. This style is not early Scythian. Instead, such images of predators are a hallmark of the Pazyryk culture, although they are much more widespread and mostly date back to the 6th–3rd centuries BC. Of course, we cannot exclude the possibility that the image of a predator was added to the figures of horses later, especially as other scenes with such horses have no predators. However, this is a fact which should be taken into account.

Several scenes with ornamented horses contain anthropomorphic figures: as a rule they are 'masters of horses' holding them with reins, wearing distinctive 'Scythian' high pointed headdresses, with bent legs and other stable iconographic features which make it possible to correlate such figures with the series of horses under consideration, even when depicted separately. One such figure is a well-known archer, pecked on a block taken by Ya.A. Sher from Oglakhty before the flooding; it is now on display in the State Hermitage Museum (Figure 11.1–2). It has the same headdress and bent legs as the 'masters of horses', while the way of depicting the body, shoulders and feet resembles anthropomorphic figures on a panel from Badalazhkin Log where they are superimposed by an ornamented horse, and on a panel with a predator from the riverside rock although his face is shown in profile and is bearded. These iconographic features are typical for a later phase of the rock art of the Minusinsk Basin, such as a skier at Sunduki, and other bearded men with plumes on the tops of their heads and weapons in their. This was also noticed by O.S. Sovetova, who placed the Oglakhty archer into the category of the

[33] Miklashevich and Ozheredov 2008: 170–76.
[34] Appelgren-Kivalo 1931: fig. 134.
[35] Sher *et al.* 1994: Oglakhty I: 56a.

Figure 10. Oglakhty riverside cliffs with reconstruction of a composition with 'marked' horses and a predator: 1–2, A.V. Adrianov's squeeze, fragments (Museum of Anthropology and Ethnography (Kunstkamera), inv. nr. 2777/180; photograph: A. Solodeynikov); 3, fragments of original rock in Abakan museum (photograph: L. Bove); 4, tracing reconstruction by the author

'bearded'.[36] It is now evident that such images refer not to the Tagar culture, but to the later Xiongnu-Xianbey period which dates approximately from the 2nd century BC to 4th century. However, what is most important is that the archer has a bow with a tiered arrowhead. It is known that such arrowheads appeared in the last centuries BC in the Xiongnu, then spread over a wide area and existed at least up to the 2nd millennium. In the Minusinsk Basin, tiered arrowheads are mainly chance finds and they are difficult to date precisely. However, S.V. Pankova, using evidence from rock art and imagery on objects, has been able to analyse tiered arrowheads of the Tashtyk culture and date some of the casual finds.[37] Moreover, it is impossible not to stress the striking similarity between the image of a bow with tiered arrowhead on a mummy tattoo from the Tashtyk cemetery at Oglakhty (excavations of L.R. Kyzlasov),[38] and one depicted on the rock (compare Figure 11.2–3). According to the latest dates, this grave dates to the 4th century.[39] It is clear that our bearded archer does not fall within the imagery of the Tashtyk culture, yet with such an arrowhead it cannot be 'Scythian' either. So, does it belong to some stage or some cultural group of the Xiongnu-Xianbey period? This is another fact which cannot be ignored in the attribution of images of the 'marked' horses.

One can also mention the depiction of saddles with bows on horses in the scene with the 'master' (Figure 4.1), although Scythian pad-saddles with supports could also be depicted in this way.[40] Finally, there is the idea that the 'beaked head' is an inherent feature of Pazyryk art. In general, many facts argue against the idea that the Oglakhty series belongs to the early stage of the Scythian 'Animal Style' and all can be explained in some other way. On the other hand, many of the 'classic' images of the series undoubtedly have very early features as listed by Ya.A. Sher. And how can one explain the fact that such horses are found in one composition with horse images typical of the late Bronze Age (Figure 4.10, shown in grey)?[41] These are not just later additions to earlier depictions as it might seem. The 'Scythian' silhouette images of a horse and an elk on this panel are pecked in exactly the same way as 'Karasuk' horses, and share the same technical methods and iconographic features. Actually, in Badalazhkin Log there are several instances where images of the Scythian period and late Bronze Age (at least according to established thinking) co-exist. Moreover, a fragment of a slab with silhouette images of horses which generally resembles horse images of the analysed series, was found by M.P. Gryaznov in 1964 at a cemetery of the Karasuk culture in the vicinity of the village of Sovietskaya Khakassia, close to the northern foothills of Oglakhty.[42] The facts in favour of such an early date are not unambiguous and may also have some other explanation.

Thus, a series of Oglakhty horses with accompanying images somehow paradoxically combines features which seem to be early Scythian, some which reflect the stage of the developed 'Animal Style', and yet others which relate to the post-Scythian period. It is not quite clear how this series correlates with other groups of early Iron Age petroglyphs in Oglakhty, including those mentioned earlier from Abrashkin Log. It is also uncertain why this series is so localised. The genesis of such a style is also not clear and there are many other questions which are also unanswered. There is always hope that further investigation will reveal other similar compositions which may help resolve these. In the meantime, the following assumption can be made. The series may not actually be a series as such. Perhaps the first scenes with 'marked' horses really appeared on the rocks of Oglakhty in the earliest stage of development of the Tagar culture. They were large in size and attracted attention with their unusual figures. And, apparently, there were many of them. They must have been a significant component of the landscape. It is likely that they made a strong impression on the 'artists' of the later stages of the Tagar culture, as well as subsequent periods; and they continued to reproduce a vivid image and recognisable subject, modifying them in accordance with the canons and ideas of their time. On the rocks of Oglakhty we certainly see petroglyphs of later ages, including even ethnographic ones, which are clearly imitations of classic originals. In addition, the noticeable images and scenes could have caused a desire not only to imitate them, but also to add one's own images to the compositions. However, even these assumptions do not explain all the peculiarities connected with that series.

Conclusion

We end with the question of how this rock art correlates with the different archaeological cultures which existed here, and conclude that the correlation of the development of Scythian-Siberian 'Animal Style' with the stages of the Tagar culture is inconclusive. Tes' art is not strictly a Scythian-Siberian style, and that stage is any case now defined as an independent culture.[43] The earliest – Bainov – phase has also moved from the Tagar culture to the Late Bronze Age according to the latest thinking.[44] Two major phases remain, namely

[36] Sovetova 2005: table 27.
[37] Pankova 2015.
[38] Pankova 2015: fig. 8.5.
[39] Pankova *et al*. 2010.
[40] On the terms related to saddle construction see Stepanova, this volume.
[41] Sher *et al*. 1994: Oglakhty III: 5.
[42] Gryaznov 1964: 49.
[43] Kuzmin 2011; and others.
[44] Lazaretov 2007.

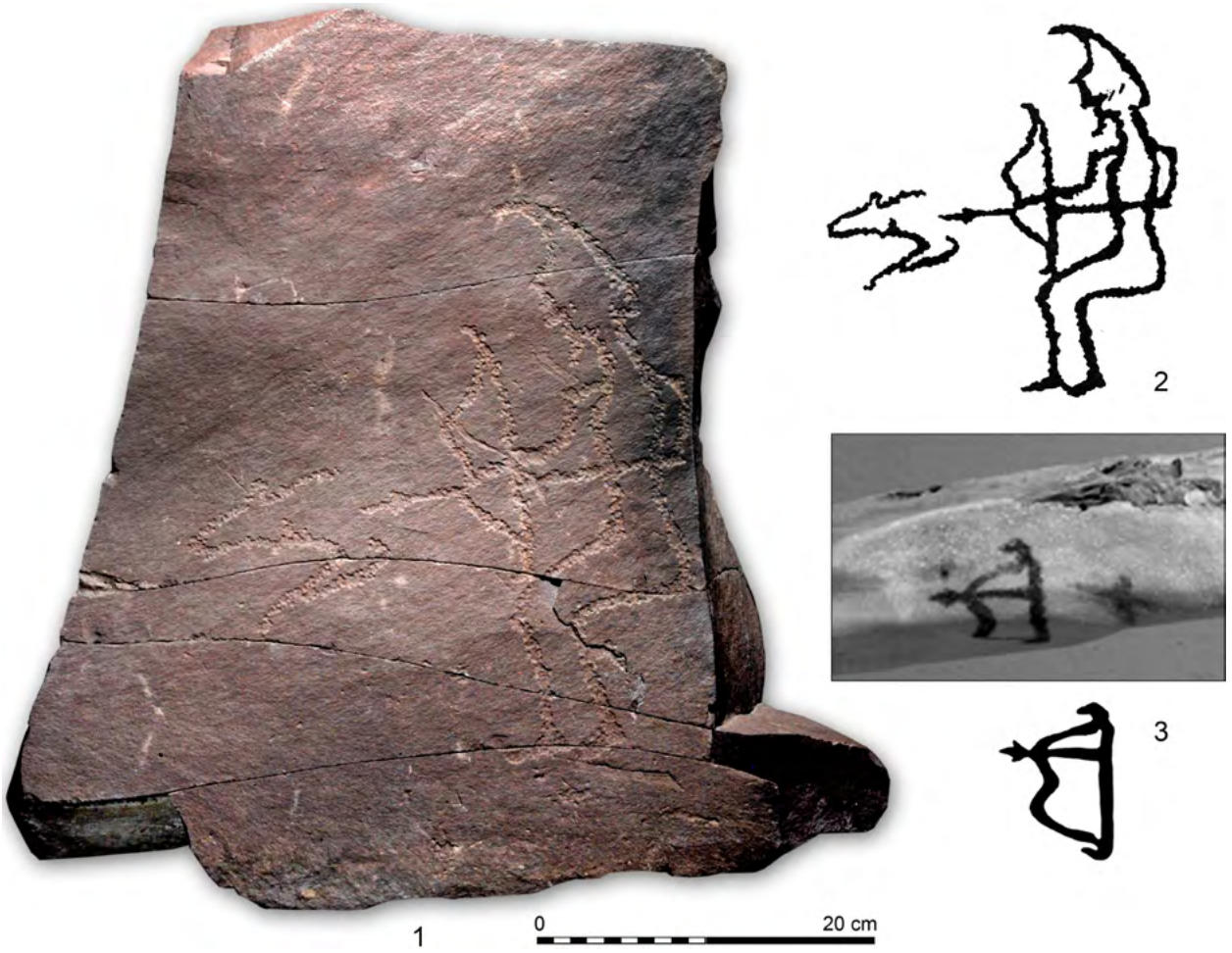

Figure 11. Oglakhty riverside cliffs: depiction of an archer with bow and tiered arrowhead and a parallel for it: 1, rock with the image (The State Hermitage Museum, St. Petersburg, inv. nr. 2564/2; photograph: E. Miklashevich); 2, tracing (after Sher *et al.* 1994); 3–4, tattoo on the mummy arm from Grave 4 of the Tashtyk burial ground at Oglakhty (after Pankova 2015)

the Podgornovo and Saragash. Do we know which rock art belongs to one and which to the other? We have to admit that we do not. Ya.A. Sher, who determined the 'early' and 'developed Scythian' 'Animal Styles' in rock art, including that of the Minusinsk Basin, did not correlate these with the phases of the Tagar culture. O.S. Sovetova, who dedicated a special monograph to Tagar petroglyphs, considered them as a whole and did not divide them into the Podgornovo and Saragash stages. This situation appears strange as their material culture and funerary rites vary considerably, and for the archaeology of Tagar burial complexes the questions of typology and the identification of stages have always been of great importance. In that rock art, which cumulatively (one may say, by default) is attributed to the Tagar culture as a whole, we actually see a significant number of different stylistic sub-groups which are united by various traits of the Scythian-Siberian 'Animal Style'. These differences are not only local: they also exist within a single site or complex, as we have shown by the example of Oglakhty, and the task of correlating them with the archaeologically identified stages of one culture is critical. This is particularly important now given the possibility that there may not be a single Tagar culture with consistently changing stages, and that the Podgornovo and Saragash cultures instead may be two independent cultural lines which co-existed during the early Scythian period.[45] Given there are notable revisions in their dating[46] the task of attribution of various groups of rock art of the 'Scythian stratum' becomes even more acute and challenging. As for the 'Scythian' rock art in Oglakhty, solving the complicated problems of its attribution is nevertheless possible. For this, it is necessary both to continue the field investigation in order to enrich the data-set and re-assess all known sources in order to produce more accurate tracings of known panels and extract all possible information from materials scattered across different museums and archives. With the accumulation of better-quality

[45] Chugunov 2013.
[46] Chugunov 2013; Polyakov and Svyatko 2009: 35–41; and others.

data it will be possible to carry out comparative and systematic analyses with refined typologies and better relative chronologies of style. Following this, rock art materials should begin to help solve some of the wider issues of archaeological chronology, the development of cultures and directions of migration.

Scythian and Sarmatian weapons with gold decoration

Raphael S. Minasyan[1]

Abstract

Several oxidised iron artefacts, including an *akinakes* (short sword), dagger, *chekan* (axe-pick) with handle, two knives and arrowheads were found at the 7th century BC site of Arzhan-2 in the Republic of Tuva. These early central Asian iron objects are remarkable for their exquisite design and intricate gold decoration. The *akinakes* is outstanding and is adorned with animal reliefs and gold openwork on both sides of the handle and blade. Scythian and Sarmatian iron objects were believed to be inlaid: the sculpted details would have been forged and subsequently inserted into the weapon. On the contrary, the dead nobleman's possessions were actually wrapped in thin gold sheets from which the decorative patterns and animal images were cut out. As the metal oxidised it leaked through the cut-out decorations and covered them. Underneath the gold sheet the oxidised metal formed hollow pockets, which led conservators and archaeologists to believe that the weapons were in fact inlaid with specially forged iron decorative elements. By observing the indentations in the oxidised metal and the traces on the bottom surface of the decorative cut-out sheets one can tell whether an artefact was inlaid or decorated with openwork. The handles of early iron Scythian and Sarmatian swords and daggers, like their cast bronze predecessors, were adorned with sculpted animal heads, but show no signs of forging. At this early stage of iron production it was virtually impossible to forge objects so complex in shape and to create iron elements to insert through inlay. Later, when weapons started to be forged, the ornate handles disappeared. This allows us to consider the possibility that early iron artefacts in central Asia were cast, as bronze weapons were, and that the casting was further modified by forging.

Keywords: encrustation; overlaid decoration; meteoric iron; iron from ore; cast iron; wrought iron; *chugun*

Introduction

A number of iron objects were found during excavations at Arzhan-2 in the Republic of Tuva and date to the 7th century BC: an *akinakes* (short sword), a dagger, a *chekan* (pointed axe-pick), two knives and many arrowheads. These are amongst the earliest iron artefacts from central Asia and are remarkable for their exquisite design and intricate gold decoration. The *akinakes* is adorned with animal reliefs and gold openwork on both sides of the handle and blade (Figure 1).[2] The iron had completely oxidised, concealing the decoration, and the conservators concluded that these items had been inlaid. The Arzhan artefacts were examined by Dr Barbara Armbruster and myself but our interpretations of the manufacturing process differ and this paper argues for a re-interpretation of the manufacturing technologies, with important implications for the re-assessment of many other decorated ferrous objects, whether in the Scythian and Sarmatian world, or earlier still in the Mediterranean where iron and probably steel was made as early as the 2nd millennium BC.

Figure 1. Cast (?) iron *akinakes* with gold overlay decoration on the blade and hilt: Arzhan-2, Grave 5, 7th century BC (National Museum of the Republic of Tuva; photograph: Vladimir Terebenin)

Scythian decorated ironwork from Arzan-2: inlaying or overlaying?

The *akinakes* has raised figures of animals on both sides of the hilt and blade, and equally elaborate

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[2] Chugunov 2004: 49; Bronnikov and Chugunov 2015: 107–109.

Figure 2. Dagger with gold hilt with gold overlay decoration on the blade. Arzhan-2, Grave 5, iron, gold, 7th century BC (National Museum of the Republic of Tuva; photograph: Vladimir Terebenin)

Figure 3. Arrowhead with overlaid decoration. Arzhan-2, Grave 5. Iron, gold, 7th century BC (The State Hermitage Museum, St. Petersburg, inv. nr. 2917/25)

decoration occurs on the other iron objects. I believe that these were decorated with appliqués and that the *akinakes* was made by casting.[3] Dr Armbruster considered my hypothesis of the application of sheet gold on iron implausible and offered her own solutions to this technical question in a series of papers. She believes that the *akinakes* was made by forging and that the decoration on the iron objects from Arzhan were not applied ('aufkleben') but instead were inlaid ('tauschieren'), and that each decorative element was created separately and then hammered into the channels and recessed areas undercut in the red-hot iron and, in order to avoid damaging the reverse side of the double-sided relief, this work would have been done with sand or ash.[4]

In contrast it is my opinion that such decoration could have been made by applying sheets of gold or silver foil onto the iron base and cutting out complex patterns and figures from them (Figures 2–3). The characteristics of the pattern and the traces on the gold sheet support this hypothesis. These decorative elements could not have been hammered into cavities carved into the iron, as Dr Armbruster believes: in fact it is difficult to cut even simple patterns on an iron substrate, especially without steel tools and the necessary skills. We can therefore posit that the inlay of iron artefacts was mastered not in the 7th–3rd centuries BC but only much later and that it did not originally consist of complex multi-figure compositions but of geometric patterns traced with pieces of wire and of sheet metal beaten into the iron base. Indeed, most ancient oxidized iron artefacts, and in some cases copper and bronze objects, decorated with gold or silver, are incorrectly described in the archaeological literature as inlaid.

In ancient times an object was carved or excised with short marks, thin lines, small circles and triangles. The sides of the cavities were undercut in a dovetail profile and inserts of a more ductile metal then hammered into them. With every blow the softer metal was stretched to fill the undercuts and become firmly secured to the underlying base. The inlays are characterised by several specific marks. The carved or excised cavities are of different depths, exhibit signs of irregular and jagged cutting, and also have specially made indentations to guarantee the secure adhesion of the inserts to the base which functions as a type of anvil so that the edges and underside of the inserted material mirror all the features of the corresponding cavity and of the defects made in the process of carving out the cavities. The edges of the inserts hammered into the base become deformed and the traces of their cutting from sheet metal disappear. Traces of the drawing disappear from the wire hammered into the cavities. Since the depth of the cavities varies, the bases of the inserts rest at different depths rather than on a single plane as they do on objects with applied decoration. We must note one

[3] Minasyan 2004; 2014: 94–98, 263–72.

[4] Armbruster 2006: 118–19, 121, 123, 133; 2007: 97; 2010. [EDS: the sword itself has not had a detailed scientific examination and without knowing if it is wrought iron (C<0.1% carbon content) or cast iron (more than 2% carbon) it is difficult to determine the mode of manufacture].

more important point: inlays always require partitions between the recessed areas. These are structural, like window frames or the lead calmes used in stained glass, and secure the inserts and it is impossible to add inlay without such partitions.

In contrast, applied decoration occurs on flat or curved surfaces. Therefore, if there are no marks left by cavities on the underside or sides of a piece of decorated sheet and the underside is instead smooth, the edges bear traces of the cutting of the decorative elements from sheet metal and there are no partitions between the inserts, then the decoration was clearly not inlaid but instead placed on the surface of the item and attached to it with an unidentified adhesive.

The chemical and electrochemical corrosion of copper and iron creates minerals. The corrosion destroys or deforms the surface of the objects and traces of their original manufacture and use. If the decoration on iron and copper objects is openwork, the corrosion layer breaks through the cut-out decoration and envelops the decorative elements from all sides. In this way the applied sheet metal appears to be inside a lump of salt. As the metal oxidized, it leaked through the cut-out decoration and covered them. Underneath the gold sheet the oxidized metal formed hollow pockets which led conservators and archaeologists to believe that the weapons were in fact inlaid with specially forged iron decorative elements. The oxidised layer underneath the gold and silver applications and inserts, regardless of whether they are flat or embossed, forms hollow pockets or ridges whose surfaces mirror all the features of the bottom of the decorative elements. When archaeological objects with a thick corrosion layer are conserved, normally only the superficial layer of any decoration is cleaned in order to minimise damage. The corroded parts remaining in the cut-out holes of openwork and within the gaps between decorative elements are therefore not cleaned and these create the appearance of partitions, which have been incorrectly regarded as being handmade. Moreover, when decorative elements fall out they expose recessed areas formed as a result of oxidisation which resemble casts of the overlays or inserts. Conservators and researchers incorrectly interpreted these hollow pockets and the intervening 'partitions' between them to be artificially carved cavities to take inlays. In fact, such cavities are simply the result of the oxidisation of the metals. The traces on oxidised copper and iron objects decorated with silver and gold indicate how the decoration was applied, even when the inlaid elements have been lost and only the cavities remain. On the other hand, if the base has completely deteriorated and only the inlaid parts have survived, one cannot accurately determine whether the object was inlaid or decorated with openwork. On the Arzhan-2 ironwork the hollows beneath the decoration are the natural result of corrosion while the decoration is applied. Objects with such decoration could not be used in everyday life and were decorated only when needed to accompany the deceased in the afterlife, as with many other objects found in Scythian and Sarmatian burials of wealthy individuals.

Sarmatian decorated ironwork from Filippovka-1

We can now turn to some other wonderful examples of ancient applied art, namely iron weapons with gold decoration found in the Sarmatian kurgans at Filippovka-1. Among these is an exceptional iron sword from burial 2 in mound 4: its narrow blade, hilt, guard and bar-shaped pommel are decorated with gold images of wild beasts (Figure 4). Several papers published in Russia, Germany and France have argued that these swords were inlaid.[5] It seems that the sword, decorated with images of animals, hunts, sacrifices and ornamental motifs, has a longitudinal groove in the centre of one side of the blade which is covered with a sheet of gold foil yet there is no such groove on the reverse. In the case of swords and knives, longitudinal grooves are present either on both sides of the blade or not at all. Although the reverse of this sword lacks both the groove and the corresponding gold sheet overlay, the composition of figures on the reverse of the blade shows that there was originally an embossed gold sheet there. Either only one gold sheet was used when the figures were traced on both sides of the blade, or when the sword was placed in the grave it was already missing the second gold sheet. The side with the gold sheet exhibits a 'fake' groove created by the oxidisation process, while the side with no gold sheet has no groove. Here, as on the Arzhan-2 weapons, a thin sheet of gold was cut out with a knife and then applied to the iron.[6] Although it is not possible to identify all Scythian and Sarmatian items which have been incorrectly interpreted as inlaid artefacts, we can assume that there are many other such cases and undoubtedly precious metal decoration is concealed on many as yet unconserved iron objects in different museums.

The Arzhan-2 iron artefacts force us to re-evaluate the decoration found on other metal objects. For instance, many artefacts from the Bronze and Iron Ages, thought to be inlaid, are in fact not. This applies to several bronze knives with gold decorations found in Greece, in the shaft tombs of Mycenae and in the 'beehive tombs' of Vaphio near Pylos. The images of animals, people and their weapons on the blades of the knives are thought to have been cut out from thin gold, silver

[5] Shemakhanskaya, Treister and Yablonsky 2009; Shemakhanskaya 2015; Armbruster 2006; 2007.
[6] Shemakhanskaya, Treister and Yablonsky 2009; Treister and Yablonsky eds 2012: 452, fig. 23.

Figure 4. Details of the obverse and reverse sides of a sword blade with gold overlay decoration. Filippovka-1, mound 4, burial 2. Iron, gold, L 57.5 cm, late 5th–mid-4th centuries BC (drawings by Irina Rukavishnikova)

and copper sheets and inlaid in the undercut bronze.[7] However, the complex miniature artwork on these artefacts and the absence of partitions between them exclude the possibility that the decorations could have been inlaid and they must instead be regarded as other early examples of the gold overlay technique.

Forging or casting?

There is another problem with early Scythian and Sarmatian iron artefacts. The relief figures of animals on both sides of the Arzhan-2 *akinakes* cannot have been produced by forging or by other methods of cold processing of metals as Dr Armbruster suggests. Such work is characteristic of the technique of casting. This led me to seek evidence of the practice of casting iron in such an early period. I came across several 'iron' items found by chance in Siberia and Kazakhstan whose hilts are decorated with sculpted pommels and cross-guards. The pommel of a dagger found near Minusinsk is especially complex: it consists of two sculpted sheep's heads with horns. An object of this shape would have been impossible to forge (Figure 5). Two *akinakai* found in Kazakhstan also have hilts of cast iron.[8]

An 'iron' *chekan* decorated with gold was found at Arzhan-2 (Figure 6.1). A similar weapon was found by chance in 2016 near Ufa in Bashkiria. The upper edge of the socket of this artefact is decorated with a relief frieze with figures of animals, while the hollow butt

[7] Durando 2005: 38.

[8] Stöllner and Samashev eds 2013: vol. I, 648–49, cats 349, 351.

Figure 5. Cast iron (?) pommel of a dagger: chance find near Minusinsk, southern Siberia, 7th–6th centuries BC (The State Hermitage Museum, St. Petersburg, inv. nr. 1669/1)

is decorated with figures of large felines on both sides (Figure 6.2). This weapon has not yet been published but according to Vladimir Ovsyannikov it is 'made of iron'. The construction and shape of these axes are the same as those of bronze cast objects (Figure 6.3). They are undoubtedly also cast and differ from the bronze artefacts only in that they are made of ferrous metal. A monolithic 'iron' dagger was found in northern Khakassia (Figure 7). The pommel of the

Figure 6. *Chekans* from the 7th–6th centuries BC: 1, iron with gold overlay decoration, Arzhan-2, Grave 5 (The State Hermitage Museum, St. Petersburg, inv. nr. 2917/19/1); 2, iron with gold decoration, chance find, Bashkiria, L 13 cm (Institute of History, Language and Literature of the Ufa Federal Research Centre of the Russian Academy of Sciences); 3, cast bronze, Arzhan-2, Grave 20 (State Hermitage Museum, inv. nr. 2817/70)

Figure 7. Hilt and cross-guard of a dagger. Iron, cast (?). L 26 cm, chance find, northern Khakassia (Shira Regional History Museum)

hilt was made in the form of a hollow figure of a recumbent animal. The cross-guard features two recumbent figures of deer facing one another with their branching antlers rising up along each side of the hilt. Judging by the construction and shape of the animals depicted one can affirm that the dagger was cast by the lost wax method or, more likely, in a two-part clay mould made with the aid of a carved wood-wax model. The dagger has not yet been restored. Its examination will make it possible to make a final judgment on the way the moulding was obtained.

The hilts of early Scythian and Sarmatian iron swords and daggers, like their cast bronze predecessors, were adorned with sculpted heads of animals, but they do not exhibit any signs of forging (Figure 8.1–2). At this early stage of iron production, it was difficult to forge objects of such a complex shape and to decorate

Figure 8. *Akinakai* with high-relief details on the hilts from the 7th–6th centuries BC: 1, cast bronze with griffins' heads on the pommel and beasts of prey on the guard, chance find, Minusinsk Basin (The State Hermitage Museum, St. Petersburg, inv. nr. 1123/56); 2, cast iron (?) *akinakes*, chance find, village of Kordachina near Krasnoyarsk (The State Hermitage Museum, St. Petersburg, inv. nr. 5531/340)

them with inlays and later when weapons began to be forged such sculpted hilts disappeared. This raises the possibility that the early iron artefacts found in Siberia were cast, as were bronze weapons, and that these were later replaced by forged versions. It further validates my earlier hypothesis about the possibility of casting iron in the 7th and 6th centuries BC.[9]

Conclusions

Judging by written sources, several methods of production and manufacture of ferrous metal objects existed in antiquity yet there are important caveats: written sources are not always closely datable, they may contain later additions and they should be read in the original language with caution paid especially to modern translated editions where the translators lack the requisite technical knowledge to understand technical terms.

It is known that the Chalybes – the Greek name for iron is «χαλυβικος σιδγρος» – were already forging iron objects during the early 2nd millennium BC and there is evidence of this in cuneiform tablets found at Boghazköy (ancient Hattusha), capital of the Hittite empire.[10] The Chinese began smelting cast iron and making objects from it from the 8th–7th centuries BC onwards. The Taoist treatise *Huainanzi* (180–122 BC) describes the way this type of iron was obtained: molten cast iron was aerated by stirring the molten metal with an iron bar and in the process the carbon was oxidised and disappeared from the cast iron. We know of Chinese weapons made of iron but they were evidently rare and even at the end of the 'Warring States' period Chinese armies mainly used bronze weapons. After the defeat of Qi, the last independent Zhou kingdom, and the unification of China into a single state in 221 BC, Emperor Qin Shi Huang ordered captured bronze weapons to be melted down. The Siberian nomads, at any rate, already had iron weapons by the 5th century BC. Far away in the north Caucasus, the local inhabitants were still using bronze weapons in the 8th century BC, but forged iron objects were also appearing by this date. Their battle-axes were now not cast-socketed like those ones found in Siberian tombs of the Scythian period, but were forged axes with an open eye for the handle (Figure 9).

As a rule, methods of producing and working with new metals were used primarily for the most prestigious and expensive items, including tools and weapons. In Scythian and Sarmatian monuments the earliest ferrous metal artefacts, such as the Arzhan-2 *akinakes*, the *chekans* from Arzhan-2 and Bashkiria, the dagger from Shira and other objects decorated in relief and overlaid decor were made by casting in the author's view. However, in the 1st millennium BC the casting of iron had been mastered only in China as far as I am aware. Cast iron is a brittle metal.[11] When objects were broken, bronze hilts or blades began to be cast on to the fragments.[12] Broken weapons and defective casts were usually repaired by pouring molten bronze into the damaged sections. These artefacts restored in

[9] Minasyan 2014: 94–98.
[10] Minasyan 2014: 53.
[11] [EDS: this would make it unsuitable for items sustaining high impact, such as a sword for instance, and if this identification is correct would imply that the swords were purely ceremonial].
[12] Minasyan 2014: 96, fig. 21.1.

Figure 9. Forged iron *chekan*: Kelermes cemetery, Grave 29, 7th–6th centuries BC
(The State Hermitage Museum, St. Petersburg, inv. nr. 2736/104)

ancient times should therefore be dated later than the originals, but not by long, as the nomads replaced cast iron, bimetallic and bronze weapons with forged steel weapons.

During the Bronze Age and early Iron Age cast bronze socketed axes were prevalent in the Eurasian steppes, so the provenance of the cast *chekans* is unclear. The earliest of these dates to the 8th century BC and was found at Arzhan-1 in Tuva.[13] Similar weapons are depicted on stone stelae found at Arzhan-1 and on the Sagit stone in western Kazakhstan[14] which date from the same period. These monuments were built by nomads and it is nomads who are depicted on them: the characters pecked into the stone have quivers hanging from their belts. This is a distinctive ethnographic feature of the Scythians which was known in Greece and in the east: Scythians with bowcase/quivers on their belts are depicted on a gold vessel from Kul Oba, on a silver cup from the 'Frequent Barrows' near Voronezh and Achaemenid cylinder seals, whereas their Near Eastern contemporaries carried their quivers on their backs.[15] There have been individual finds of *chekans* in the Near East. They are dated later than those from Arzhan and researchers link their arrival there with the Scythian invasion.[16]

In my opinion, the appearance of bimetallic *chekans* with cast bronze sockets and forged iron heads[17] among the nomads can be explained by the start of the production of forged objects. It was not possible to make a traditional socketed *chekan* by forging, and they were not yet capable of making a *chekan* or axe with an eye for the handle. And when the nomads began to produce high-quality forged steel weapons, cast weapons disappeared. In my opinion, this transformation occurred in the following sequence: they originally had cast bronze weapons, then weapons of cast bronze and cast iron, followed by bimetallic weapons with forged iron heads, and finally forged steel weapons. Since the nomads did not cast ferrous metals, just like other peoples of the world, it has to be assumed that these objects came from China. However, if the nomads' early ferrous metal weapons were Chinese, and it is difficult to imagine where else they could have come from, the question arises: where did the nomads' get their forged steel weapons from? Either they obtained them from another outside source or they borrowed the perfected technology of steel production from somewhere, but that course of events is hard to imagine, as it is impossible to master a new manufacturing process without the necessary knowledge.

The method of manufacturing early 'iron' *akinakai* and *chekans* can be determined through metallography, thus it can be established whether items were cast or forged by the structure of the metal and its chemical composition but in the cases discussed here this analysis has not been performed. If analysis shows that early Scythian and Sarmatian weapons were cast iron, it will be necessary to establish who made these weapons for them. If the analysis points to steel, which is not very likely, one would have to determine the place where the casting had been mastered. It is impossible to imitate the effects of casting simply by hammering. Cast and forged objects differ in the structure of the metal, shape of the items, methods and tools used to make them and surface appearance. The methods of manufacture of objects and their proliferation are not the same thing. In this paper I have indicated generally accepted dating, but it must be borne in mind that all new introductions in manufacture are basic chronological landmarks, and here only accuracy is required. When technical means and surface examination enable the methods of the manufacture of cast iron and various types of steel to be determined and the places where they were made are pinpointed, we will then be able to understand the strategy of the practical actions of the metalworkers and craftsmen who worked in a lesser-known period of iron production.

[13] Gryaznov 1980: fig. 11.
[14] Simpson and Pankova eds 2017: 82–83, cat. 28, fig. 63; 203.
[15] Simpson and Pankova eds 2017: 292–93, cats 205–206; cf. Ghirshman 1964: fig. 331.
[16] Curtis and Tallis eds 2005: 234, cats 436–38; Hauptman 1983: pl. 56.
[17] Chlenova 1967: pl. 10.9; Balakhvantsev 2015: fig. 1.

Gold of Peter the Great: Scythian goldsmithing techniques

Aude Mongiatti,[1] Elena Korolkova[2]

Abstract

The Siberian Collection of Peter the Great is the earliest archaeological collection of any kind in Russia and contains around 240 gold artefacts from the ancient Scythian and Sarmatian nomadic cultures of Eurasia. This unique collection of pairs of symmetrical buckles, torcs, bracelets and other items of personal adornment provides an important source for understanding these cultures. Unfortunately, the lack of any precise data on their findspots, owing to their discovery through tomb robbing rather than archaeological excavation, the gradual accumulation of objects and frequent museum transfers, create a complex story for this collection, yet it remains one of the most valuable sources for research on the history of early Eurasian nomads and provides clues to their material and spiritual cultures. The manufacturing and decorative technologies of 15 gold artefacts from this collection were studied non-invasively using digital microscopy and scanning electron microscopy. High-magnification photomicrographs help identify and record features, tool marks and surface textures which are characteristic of the goldsmithing techniques. This investigation confirmed that all but one of these belt plaques were cast whereas most other artefacts were manufactured by hand-working gold sheets and further decorated by chasing, repoussé and punching. The wide range of identified techniques was widely known and commonly used by goldsmiths in the 1st millennium BC, although the casting process involving textile seems to be more confined to the Far East and is so far unknown to the Near East and central Asia. The hand-working manufacturing and decorative techniques are similar to those previously identified on Achaemenid 'Court Style' and Scythian-style artefacts from the Oxus Treasure which suggests some close contact and exchange of knowledge and skills between Achaemenid and Scythian goldsmiths.

Keywords: Siberian Collection of Peter the Great; gold; digital microscopy; tool marks; metal-working technologies

Introduction

The pastoral nomads living during the 1st millennium BC and generally known as Scythians or Saka have long been particularly famous for their unique 'Animal Style' decoration and high quality of craftsmanship, and several papers elsewhere in this volume dwell on this.[3] This distinctive style and the fine workmanship involved are well represented on jewellery and personal ornaments made of a wide variety of materials including leather, fur, felt, wood and metal, often embellished with gold and/or inlays of glass and semi-precious stones. Stylistic and iconographic influence from contemporary neighbouring cultures can be seen in their material culture: there are the Greek-style jewellery and Achaemenid tablewares from Filippovka in the Ural region of southern Russia,[4] and Kul-Oba in eastern Crimea,[5] while Achaemenid motifs and imports have also been found at Pazyryk, far to the east in the Altai mountain region.[6] In addition, the fusion between Achaemenid, Hellenistic, Lydian and Siberian/Altai stylistic traditions and retention of heirlooms is reflected in the 1st century graves at Tillya tepe in northwest Afghanistan,[7] and Scythian iconography is clearly represented in the Achaemenid Oxus Treasure.[8] However, the Scythians have developed, adapted and established their own distinctive artistic designs, for which they are now renowned and which have themselves influenced or been incorporated into other stylistic traditions.

The context of the BP exhibition *Scythians: warriors of ancient Siberia,* held at the British Museum in the autumn and winter of 2017/18, offered the exceptional opportunity for a collaborative scientific study of some of the most iconic gold artefacts from the Siberian Collection of Peter the Great. This large and unique archaeological collection of objects is held in the State Hermitage Museum in St. Petersburg and was established by Peter the Great at the beginning of the 18th century.[9] Selected gold artefacts were brought to the Department of Scientific Research in the British Museum during the installation phase of the exhibition for non-destructive scientific investigation

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[3] Korolkova, this volume.
[4] Aruz *et al.* eds 2000: 178–79, cat. 127.
[5] Williams and Ogden 1994: 136–51.
[6] Simpson and Pankova eds 2017: 275, cat. 189, figs 157–58.
[7] Sarianidi 1985; Francfort 2012; Hiebert and Cambon eds 2011: 210–93, cats 117–227.
[8] Dalton 1964; Mongiatti 2017; 2018.
[9] For further details on the collection see Korolkova 2017*a*.

of their manufacturing and decorative techniques. These objects lack archaeological provenance which complicates understanding of their exact date or place of production.[10] The technical study of their construction remains nonetheless relevant to compare with that from their contemporary bordering cultures, since Classical Greece to the west of the Scythian territory, the Achaemenid empire to the south and the Chinese territories on the eastern border applied a wide range of gold working technologies. In addition to external stylistic inspiration, foreign technologies have probably had an impact on Scythian gold working but the extent to which these processes were incorporated or adapted from western, southern and eastern metal-working traditions is not yet fully understood. Simultaneously, Scythian goldsmithing techniques and style are also likely to have influenced their neighbours.

The artefacts studied include two tubular torcs (Si 1727 1/62, Si 1727 1/145) and a coiled bracelet with zoomorphic terminals (Si 1727 1/55), an aigrette showing a griffin-vulture pouncing on a ram (Si 1727 1/131), a fluted vessel with feline-shaped handles (Si 1727 1/71), a gold bridle fitting with a feline mauling an elk (Si 1727 1/29), a plaque in the shape of a coiled panther (Si 1727 1/88) and eight other belt plaques, each belonging to symmetrical pairs (Si 1727 1/3, Si 1727 1/11, Si 1727 1/15, Si 1727 1/70, Si 1727 1/157, Si 1727 1/162 and Si 1727 1/242). All of the objects are very finely decorated with distinctive 'Animal Style' motifs or traditional Scythian scenes yet show stylistic influences from neighbouring cultures. On one hand, all large gold belt plaques but one, are more stylistically reminiscent of the easternmost regions of the Scythian territory, with two of them being clearly related to northwest China. On the other hand, all other artefacts are more evocative of Achaemenid and Classical Greek styles. This research builds on earlier studies of objects in this collection, including artefacts never examined before and applying imaging and analytical techniques to this collection for the first time in order to identify evidence of manufacture.

Methodology

15 gold artefacts from the Siberian Collection of Peter the Great, which were dated stylistically to the first half of the 1st millennium BC, were studied using non-invasive scientific techniques. Physical features, tool marks and surface textures, which are characteristic of the specific goldsmithing techniques used to manufacture and decorate the artefacts, were identified and recorded using a combination of X-radiography, digital/optical microscopy, scanning electron microscopy (SEM) and Raman spectroscopy.

[10] Korolkova 2017*a*.

Digital radiography (DR) was carried out on four artefacts: a fluted vessel (Si 1727 1/71), an aigrette (Si 1727 1/131) and two torcs (Si 1727 1/62 and Si 1727 1/145), using a PerkinElmer XRD 1621 AN15 ES flat panel digital detector, with a 410 x 410 mm active area and 0.2 mm pixel pitch. The fluted vessel was radiographed using an X-ray voltage of 450 kV and a beam current of 2.65 mA with a focal spot selection of 0.4 mm. Images were integrated over 60 frames of 50 ms each (total exposure time of 3 s). The aigrette was radiographed using an X-ray voltage of 260 kV and a beam current of 1.55 mA, with a focal spot selection of 0.4 mm in all cases. Images were integrated over 100 frames of 67 ms each (total exposure time of 6.7 s). The same parameters were applied for computed radiography (CR) with an exposure time of five minutes and a 10"x12" CR plate (Computed radiography imaging plates: Carestream Industrex Flex HR). The two torcs were radiographed using an X-ray voltage of 450 kV and a beam current of 2.65 mA with a focal spot selection of 0.4 mm. Images were integrated over 30 frames of 500 ms each (total exposure time of 15 s). The X-ray beam was filtered with 1.8 mm brass, except for the torc Si 1727 1/145, for which 3.3 mm brass was used. This brass filter removes the lower energy photons from the spectrum, as these photons are more likely to be scattered, thus reducing image contrast.

SEM examination was carried out using a Hitachi S-3700N variable pressure SEM under a variable pressure of 40 Pa. Images were recorded in secondary electron (SE) mode, to provide information about the topography, and in backscattered electron (BSE) mode, which reveals the differences in mean atomic weights of the elements present by making denser elements appear paler in image contrast than lighter ones. Although the SEM has proved to be a very useful complementary instrument to digital microscopy, the time constraints around the exhibition schedule have only made the study of three artefacts possible (two belt plaques Si 1727 1/15 and Si 1727 1/70 and a horse breast plaque Si 1727 1/88). Photomicrographs of all artefacts were recorded using a Keyence digital microscope at various magnifications (x20 to x150).

Manufacture and decorative techniques

All these gold items are the products of highly skilled craftsmen. They appear to be the result of two distinct technological traditions: half were manufactured by hand-working gold sheets and wires and the others by casting. On one hand, the torcs, the fluted vessel, the aigrette, the gold bridle fitting and one belt plaque comprise multiple components made of gold sheet and wire, which have been hand worked separately and assembled together. On the other hand, all belt plaques, except the one aforementioned (Si 1727 1/6), are cast.

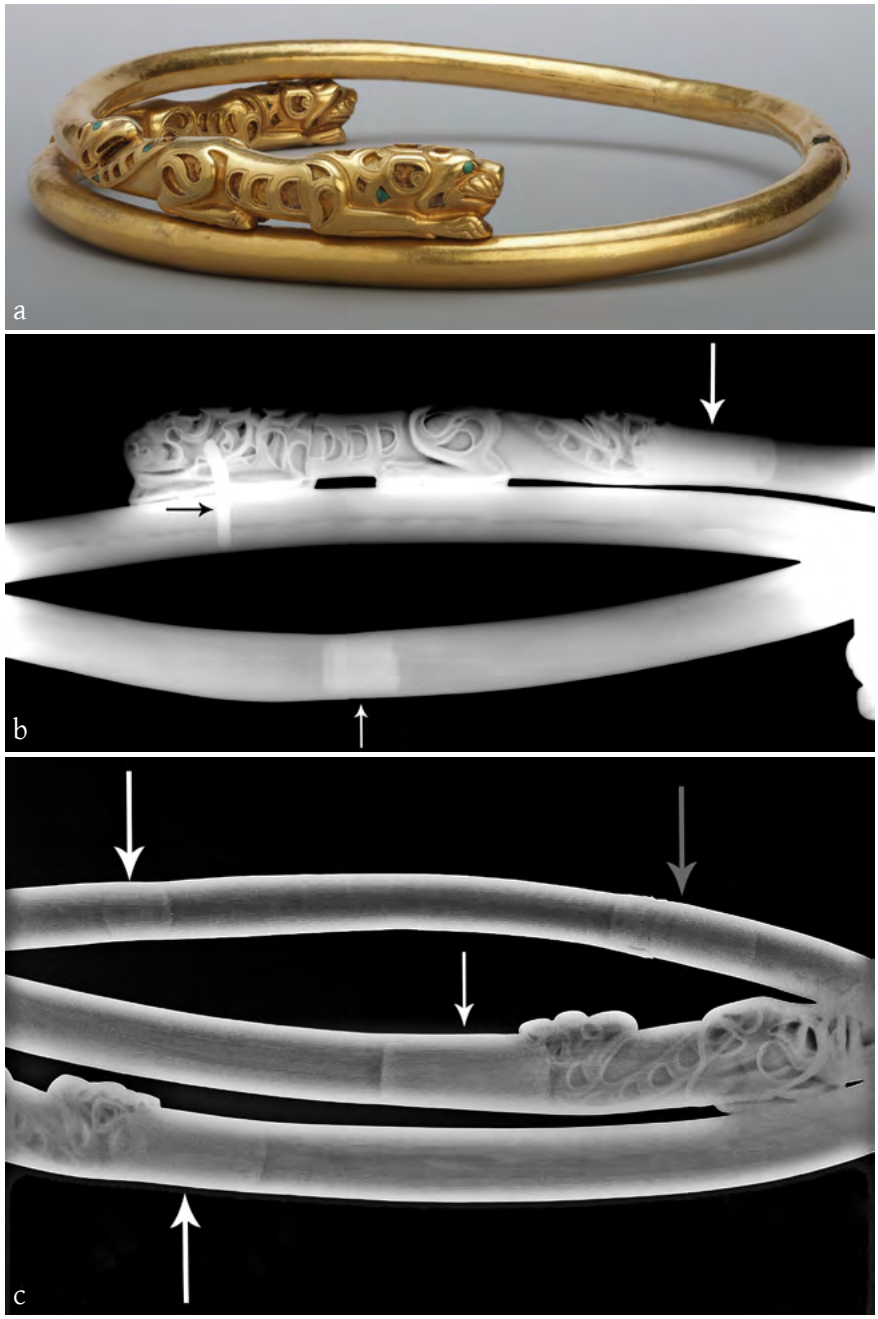

Figure 1. Achaemenid-style gold tubular torc (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727 1/62; (a), photograph © V. Terebenin 2017; (b)–(c), radiographs showing the brighter regions where tubes and terminals overlap (white arrows), the sliding opening system on the right (grey arrow) and the hidden pin inside the feline head and tube below (black arrow); (c), note the long horizontal dark line going along the middle of the tube, which indicates where the two edges of the gold sheet meet and were soldered together (radiographs: D. O'Flynn)

The spiral bracelet (Si 1727 1/55) and the plaque in the form of the coiled panther (Si 1727 1/88) combine both techniques. The wire composing the body of the former was most likely hammered from a small gold ingot to achieve a circular section, while the terminals were cast and then soldered onto the coiled wire. The latter was cast and further worked by hand-held tools to create inlay cells.

Achaemenid-style tubular torc (Si 1727 1/62)

Radiographs show that this is made of four curved tubes – three visible and one hidden as part of the opening mechanism – and two hollow zoomorphic terminals (Figure 1a). The tubes were shaped from sheets, most likely hammered around a round-sectioned former, and soldered along their lengths, as shown by the join visible in several areas of the inner side (Figures 1c, 2). The radiograph shows a darker seam line, where the two sheets join, indicating that the sheets are not overlapping but held together by a simple butt-joint (Figure 1c). Two of the tubes were then inserted into one another and soldered as shown by the brighter areas of overlap on the radiographs (Figures 1b, 1c). A third tube is attached through the opening mechanism, which relies on two tubes sliding over a short internal tube after the removal of a spigot (Figures 1c, 3). The current holding device is a brass rivet, which does not appear removable, as flat heads noticeable on either side of the rivet would

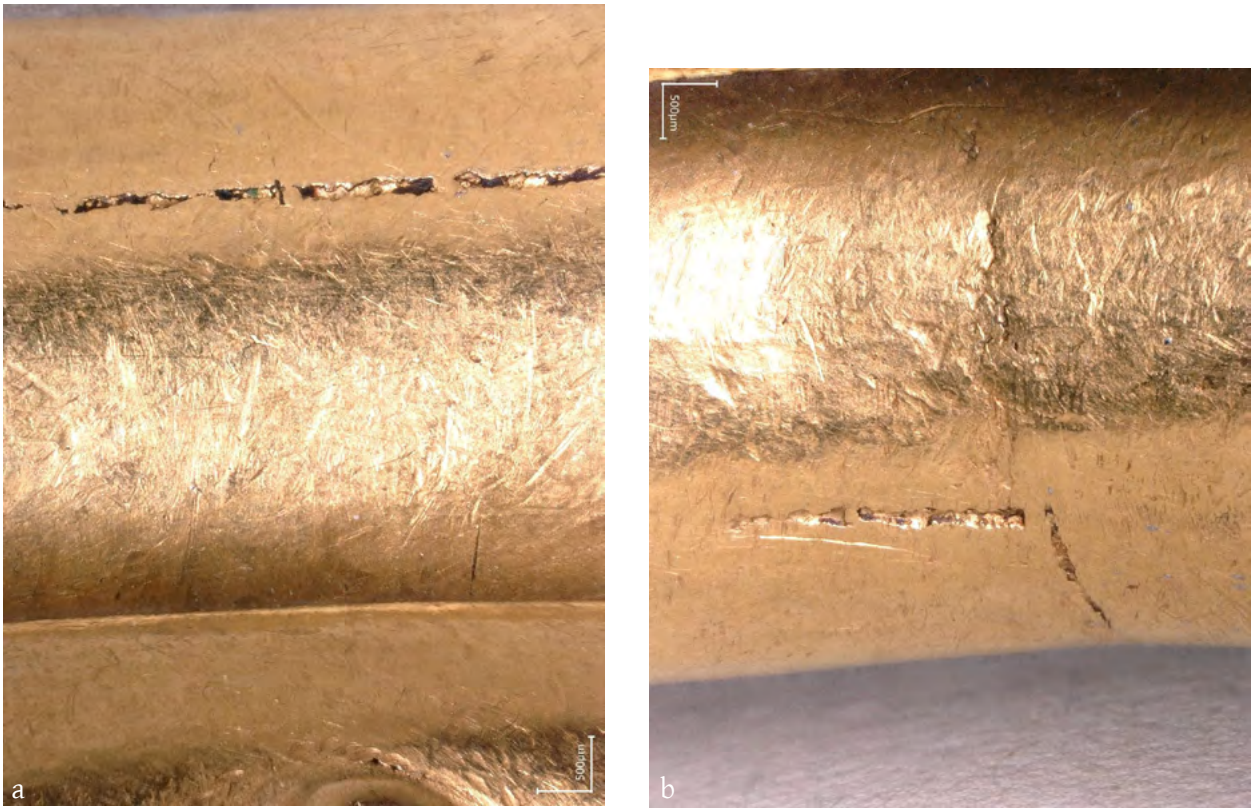

Figure 2. (a), Seam on torc Si 1727 1/62, where the edges of the sheet curled into a tube meet in a butt-joint, (b), same horizontal butt-joint seam and vertical seam where the overlapping tubes join and have been soldered (photomicrographs: A. Mongiatti, 30x, scale: 0.5 mm)

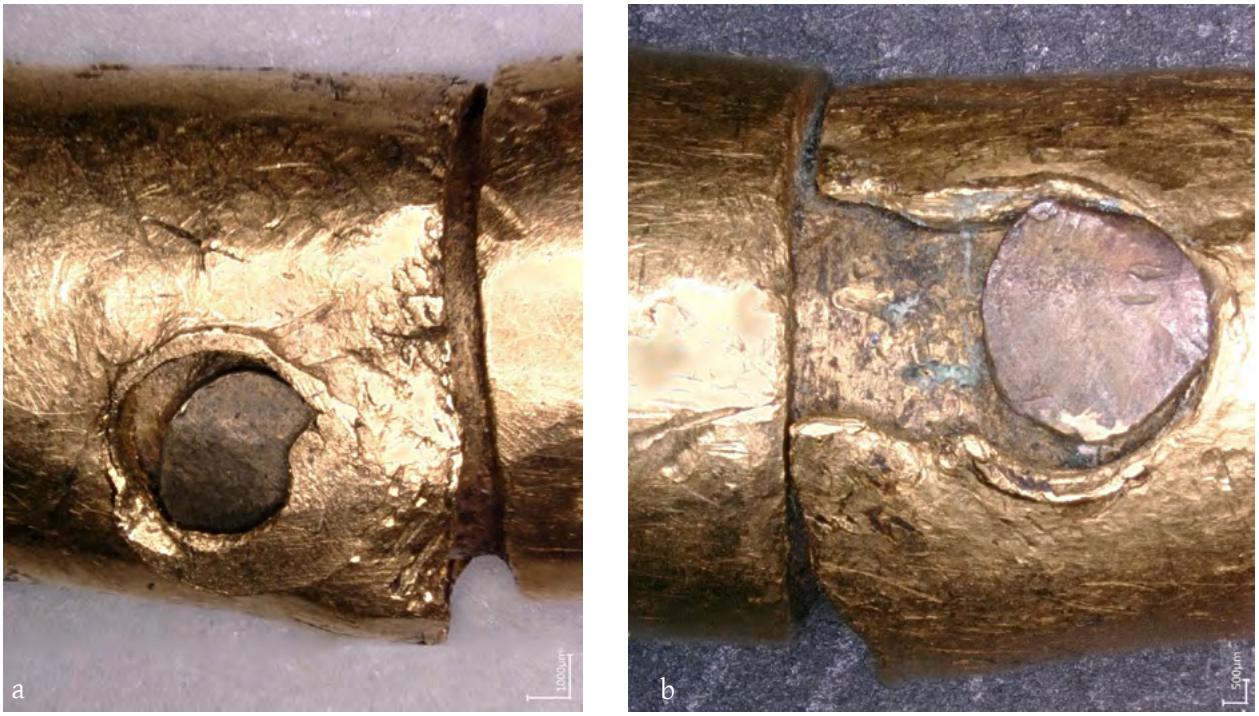

Figure 3. (a) Top and (b) bottom views of the opening mechanism on the torc Si 1727 1/62, showing the brass rivet heads on either side, now locking the tubes in place and therefore preventing the torc from opening (photomicrographs: A. Mongiatti; 20x, (a) scale: 1 mm, (b) scale: 0.5 mm)

Figure 4. (a) Seam where the halves composing the feline terminal have been soldered together and (b) feline features achieved by chasing. Note the turquoise inlay used to create the tiger's eye (photomicrographs: A. Mongiatti; 20x, scale: 1 mm)

Figure 5. Empty inlay cells on the (a) feline head and (b) tail showing the dark red resin, potentially used as adhesive for securing the now-lost inlays to the base and walls of the cell (photomicrographs: A. Mongiatti; 20x, (a) scale: 1 mm, (b) scale: 0.5 mm)

lock the torc permanently, and probably illustrates a later repair (Figure 3). The hollow terminals are composed of symmetric halves, which were shaped individually from sheets and then soldered together: a join, visible in places, runs along the length of the abdomen of the lower feline (Figure 4a). Each half could have either been first shaped by hammering a sheet into a negative die or mould or through working the sheet onto a positive former. The highly three-dimensional inlay cells and physical features of the feline were achieved using a combination of free hammering from the back, i.e. repoussé work, and chasing,[11] while the final decoration was most likely carefully chased (Figure 4b). A dark red resin was noted in most of the inlay cells and may have been used as the adhesive for the now-lost coloured inlays (Figure 5). All joins were burnished so, as a result, most are barely visible. The radiographs also revealed

[11] Untracht 1982: 93–100, 105–10.

Figure 6. Greco-Scythian tubular torc (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727 1/145: (a), photograph © V. Terebenin 2017; (b) radiograph showing how whole components of the torc are hollow and how the two tubes sitting on top of each other are actually each made of two tubes (white arrows). Note the two long and thin pins passing through the lions' heads and the tubes below and the middle one securing the three tubes stacked on top of each other together (radiograph: D. O'Flynn)

an interesting and unexpected pin, most likely a solid metal wire, inside the head of the upper feline and the hollow tube below, which is inconspicuous from the outside (Figure 1). This pin, together with the addition of a rivet and the lower feline being spot-soldered to the tube above it (Figure 1), suggests an intervention post-manufacture, possibly a repair. A closely related torc from the same collection (Z-568) was made using exactly the same technique; both are believed to be of Achaemenid manufacture. Similar contemporary torcs from Peter the Great's Collection (Si 1727 1/67, Si 1727 1/57),[12] and a rich burial from Issyk in Kazakhstan,[13] also combine curved hollow tubes and hollow feline-shaped terminals made from two halves and soldered to the tubes. The latter apparently opens in a similar way by sliding the tubes open, while the former two display two sets of hinges, comparable to the Greco-Scythian torc presented below.

[12] Aruz *et al.* eds 2000: 286–87, cat. 208.
[13] Akishev 1978: pls 28–29.

Greco-Scythian tubular torc (Si 1727 1/145)

This torc is made of seven hollow curved tubes designed to resemble solid spiral beaded wire: three long tubes on top of each other on one side of the two sets of opening hinges and what appears to be two on the other (Figure 6a). The radiograph however shows that the latter two tubes are each made of two shorter tubes inserted into and soldered to one another to create two longer tubes sitting on top of each other (Figure 6b).The spiral pattern was produced after the sheets were shaped into tubes, as there is no discontinuity in the spirals going over the longitudinal joins (Figure 7). For this purpose, the hollow tubes would have been temporarily filled with a malleable and resilient material, e.g. clay, sand or resin, to prevent them from collapsing while the spiral pattern was produced. Each row of tubes is kept separate at the same distance by a series of small hollow spheres, composed of two hemispheres soldered together, as shown by the join going around their entire circumference (Figure 7b).

Figure 7. (a) Seam on torc Si 1727 1/145, where the edges of the sheet curled into a tube overlap (brighter areas underneath the tubes on the radiographs, cf. Figure 6b) and were soldered together; (b) same horizontal burnished seam on the spiral-beaded tube and on the hollow sphere separating the tubes. Note the vertical pin crossing the upper tube and sphere (photomicrographs: A. Mongiatti, 20x, scale: 1 mm)

Each hemisphere would have been produced by pressing a sheet of gold into a die (also called matrix, mould or doming block[14]) with negative shapes of hemispheres, such as one found in Egypt as part of a goldsmith's tool set.[15] Several of these spheres are now lost, revealing traces of the solder joining them to the tubes above and beneath them. The lion-head terminals are also hollow and made of gold sheet, using repoussé work and chasing, possibly from symmetrical halves shaped separately and soldered together, although no join has been identified (Figure 8). The ends of the uppermost tube have been inserted into the heads (Figure 6b), although they do not appear to have been strongly soldered together, if at all, as the heads still move. The joins have however been hidden by added decoration in the form of beaded and spiral beaded wires and flat strips of gold soldered together and wrapped around the ends of the tubes (Figure 9a). The ends of the lower tubes joined to the hinges are also hidden by decorative elements made of short strips of beaded wires wrapped around them in a similar way (Figure 9b). It is interesting to note that beaded wire is not a common decorative technique used in Classical Greek jewellery before the 4th century BC,[16] and is even less

Figure 8. Lion's head on torc Si 1727 1/145 most likely produced by repoussé work of two separate halves and its face features achieved by chasing (photomicrograph: A. Mongiatti, 20x, scale: 1 mm)

[14] Untracht 1969: 83–84.
[15] Ogden 1982: 36, fig. 4.5.
[16] Ogden 1982: 23–24; 1998.

Figure 9. Decorative beaded and spiral-beaded wires and narrow strips on torc Si 1727 1/145 hiding (a) the fastening system between the terminal and the tube and (b) the soldered join between the hinges and the tubes; note the reddish-pink colouration of the gold surface, which is characteristic of corrosion on archaeological gold artefacts (photomicrographs: A. Mongiatti, 20x, scale: 1 mm); (c) loop-in-loop chain securing the locking pin attached to the hollow tube by a soldered circular wire (photomicrograph: A. Mongiatti, 30x, scale: 0.5 mm)[17]

popular on Achaemenid ornaments. The locking pins were originally attached to the tubes by a loop-in-loop chain made of strip-twisted wires (Figure 9c); one pin has lost its head and attachment system. These pins slide through small flat pieces of gold sheet curved into an annular shape, which are soldered to the decorative elements alternating between either side of the locking system (Figure 9b). In addition to these features, this torc shows two pins securing the lion heads to the two tubes underneath them and a third pin securing the three tubes and their two separating spheres together (Figures 6, 7b). These very conspicuous pins do not seem to be part of the original artefact and may reflect an ancient post-manufacturing repair.

Horizontally fluted vessel (Si 1727 1/71)

This vessel is made of a single raised sheet of gold for the body and hollow feline-shaped terminals (Figure

[17] Frantz and Schorsch 1990.

Figure 10. Fluted vessel (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727 1/71): (a) © V. Terebenin 2017; (b) radiograph showing the vessel body made of one single raised sheet of gold and the hollow feline-shaped terminals (radiograph: D. O'Flynn)

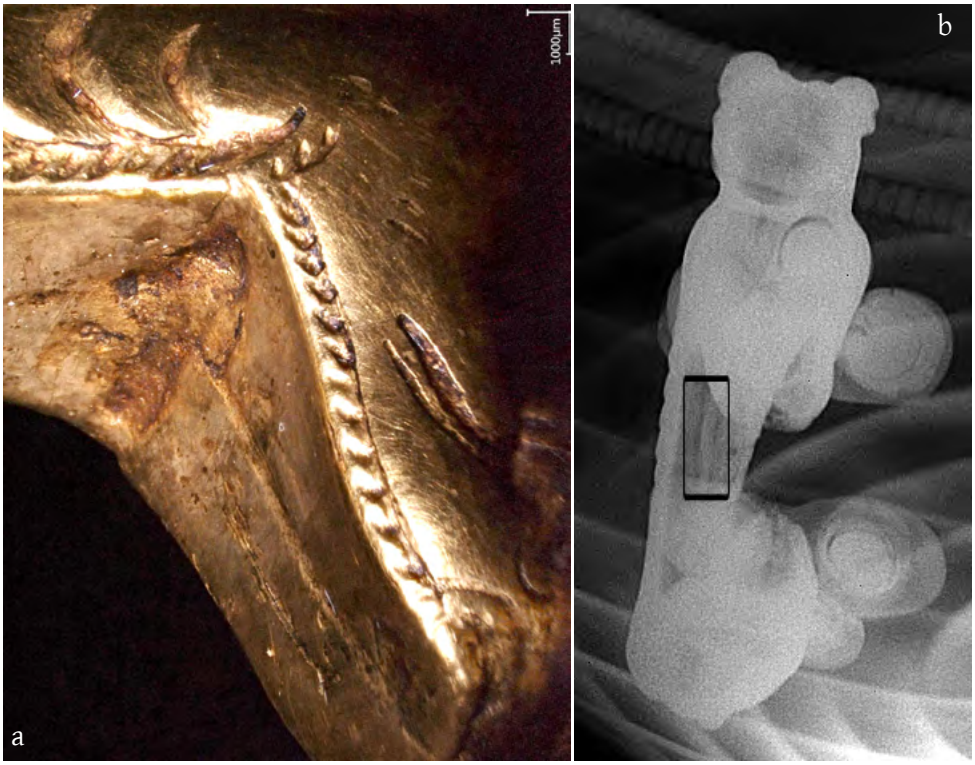

Figure 11. (a) Abdomen and front legs of a hollow feline on vessel Si 1727 1/71 with the central seam visible underneath, where the halves shaped separately from gold sheet were soldered together (photomicrograph: A. Mongiatti, 20x, scale: 1 mm); (b) close-up view of the radiograph of a handle showing the central seam on the abdomen of the feline (black rectangle) (radiograph: D. O'Flynn)

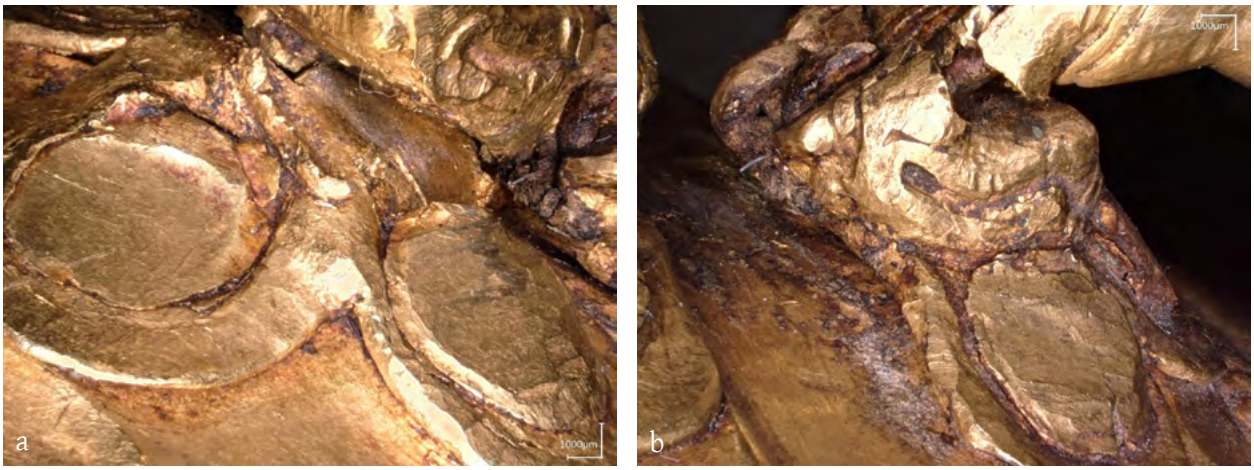

Figure 12. (a) Rivets hammered flat in the flowered-shaped base of the feline handle on vessel Si 1727 1/71 to mechanically attach the latter to the body of the vessel; note how the rear paws of the feline have detached from the base and the gold sheet has torn, revealing a hollow cavity; (b) same attachment system for the front paws of the feline, showing how the flowered-shaped base is directly attached to the paws and secured by riveting; note the dark red areas on both images where a resin has most likely been used as an adhesive (photomicrographs: A. Mongiatti; 20x, scale: 1 mm)

10). The latter are made from symmetric halves in a similar way to the terminals of torc Si 1727 1/162, and a join is visible along the abdomen of one of the felines and under the front legs (Figure 11). The handles are secured to the body through rivets hammered flat into the petal-shaped base of the handles and burnished (Figure 12). A dark red resin, like that observed in the inlay cells of the torc Si 1727 1/62 and on the handle base of the fluted vessel Si 1721 1/71, and mostly visible in join areas may have been used as ancient adhesive, possibly to further secure the handles to the body (Figure 12). A similar combination of techniques of a raised body sheet with soldered hollow handles can be seen on a 5th century BC Achaemenid amphora from Filippovka,[18] although the mouflon-shaped handles on the latter only appear to be soldered and are not riveted. Different artefacts combining mechanical joining techniques, such as riveting and folding, with soldering have been found in 7th century BC Arzhan-2.[19]

Aigrette (Si 1727 1/131)

This splendid aigrette in the shape of a griffin-vulture pouncing on a ram comprises two main elements: a decorated flat gold sheet, most likely hammered into a die, and a hollow bird of prey's neck and head in relief (Figure 13). The three-dimensional head is made of halves soldered together, as shown by the join running along its crest and inside the base of the neck visible at the back (Figure 14). Numerous elements have then been added to it for further decoration, such as short strips individually soldered to the base sheet. These strips are either curved into tubes or U-shaped to create little loops on the tail or inlay cell walls on the griffin-vulture body and neck respectively (Figures 13, 15). The ears are also separate pieces of gold sheet inserted inside the hollow head and soldered to it; one ear is now lost leaving a hole in the head. Two smaller sheets are soldered to the reverse side at the top of the griffin-vulture wings: six solid wire loops are soldered onto each of the sheets with the most probable function of attaching the aigrette to a head-dress (Figure 13c). A perfectly circular pierced hole passes through the vulture's beak, possibly where a now-lost pendant once hung. Chasing and punching were used to create the texture on the bodies of the animals (Figures 16, 17); chasing was also used to create the short straight lines on the vulture's tail and wings feathers, as well as inlay cells on the goat and the griffin-vulture's eye (Figure 16). The smaller and finer chased patterns differ from the main outlines achieved by pressing the sheet into a die in the marks left by the chasing tool, which are much subtler on the back of the sheet (Figure 17). All inlays appear to be now lost, unless the dark red resin visible in some cells and similar to that noted above on the handle base of the fluted vessel, was part of the original inlay materials (Figure 18).[20] Alternatively, this resin may otherwise have been placed at the bottom of inlay cells to adhere the piece of stone or glass into the cell. Finally, the aigrette has been cut from the front to create some openings.

Gold bridle fitting (Si 1727 1/29)

This fitting was made of a relatively thick sheet which had been hammered into shape over a spherical former

[18] Yablonsky 2013: 96, cat. 358; Aruz *et al.* eds 2000: 152–53, cat. 93.
[19] Armbruster 2006; 2007; 2009; 2010.
[20] This resin-based material has not been analysed. It is hoped that analytical data can provide more information on this resin in the future.

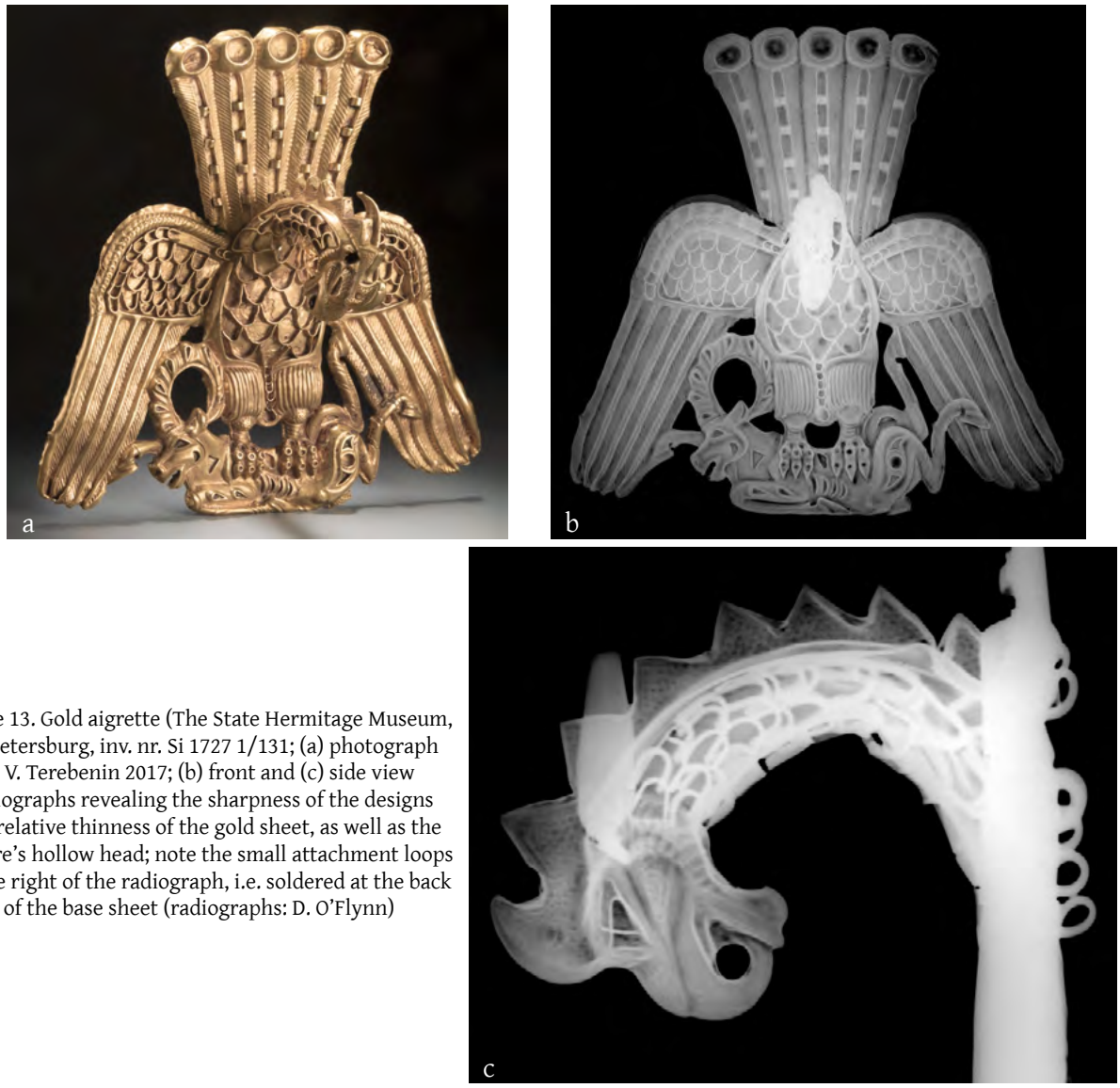

Figure 13. Gold aigrette (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727 1/131; (a) photograph © V. Terebenin 2017; (b) front and (c) side view radiographs revealing the sharpness of the designs and relative thinness of the gold sheet, as well as the vulture's hollow head; note the small attachment loops on the right of the radiograph, i.e. soldered at the back of the base sheet (radiographs: D. O'Flynn)

Figure 14. (a) Burnished join on the crest of the vulture on aigrette Si 1727 1/131, where the halves worked separately were soldered together to create the three-dimensional head (photomicrograph: A. Mongiatti; 20x, scale: 1 mm); (b) reverse side of the aigrette at the base of the vulture's neck, showing a curved join where the base sheet and the sheets used to create the vulture head overlap and the vertical seam of the halves composing the neck soldered together (photomicrograph: A. Mongiatti; 30x, scale: 0.5 mm)

Figure 15. Cloisonné cells on the vulture's chest on aigrette Si 1727 1/131 made of small strips of gold bent to the desired shape and soldered to the base sheet: each would have originally contained an inlay of stone, glass or organic material, but they are now all missing (photomicrograph: A. Mongiatti; 20x, scale: 1 mm)

Figure 16. Detail of the punching work on the (a) vulture's head and crest, (b) its knee joint on aigrette Si 1727 1/131, to replicate the skin texture and of (b) the chased lines meant to replicate the feathers on the legs; note the triangular shape of the vulture's shallow eye and the larger hemisphere on (a), it is possible that inlays are now missing in both shapes (photomicrographs: A. Mongiatti; 20x, scale: 1 mm)

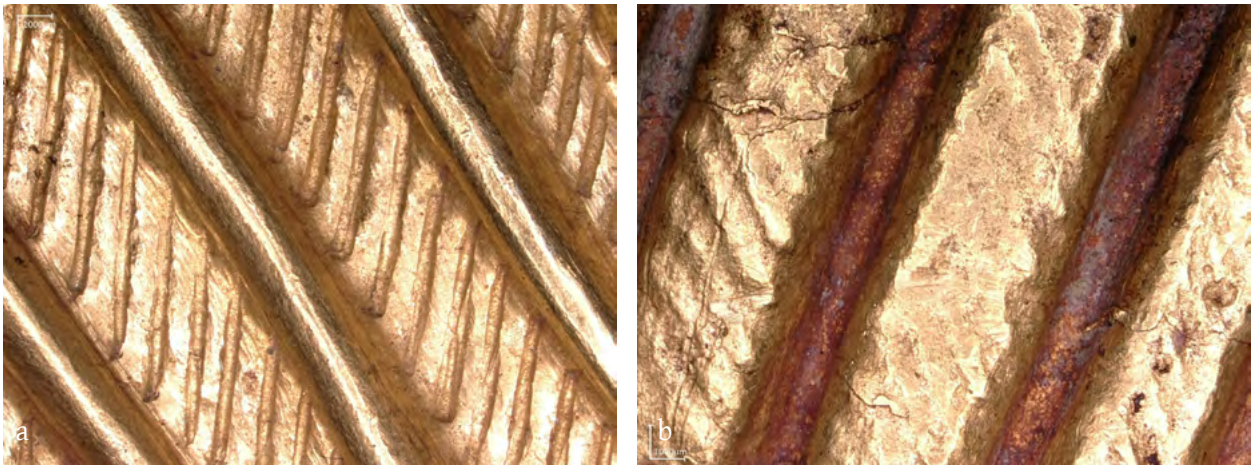

Figure 17. (a) Front and (b) back of the vulture's left wing on aigrette Si 1727 1/131: note the difference in depth of impression or rise between the long lines, most likely representing the rachis of the feather and created when the sheet was initially pressed into a die, and the numerous short lines, most likely representing the barbs of the feather and chased; the rachis is very three-dimensional while the chased barbs only left very subtle marks on the reverse side (b) (photomicrographs: A. Mongiatti; 20x, scale: 1 mm)

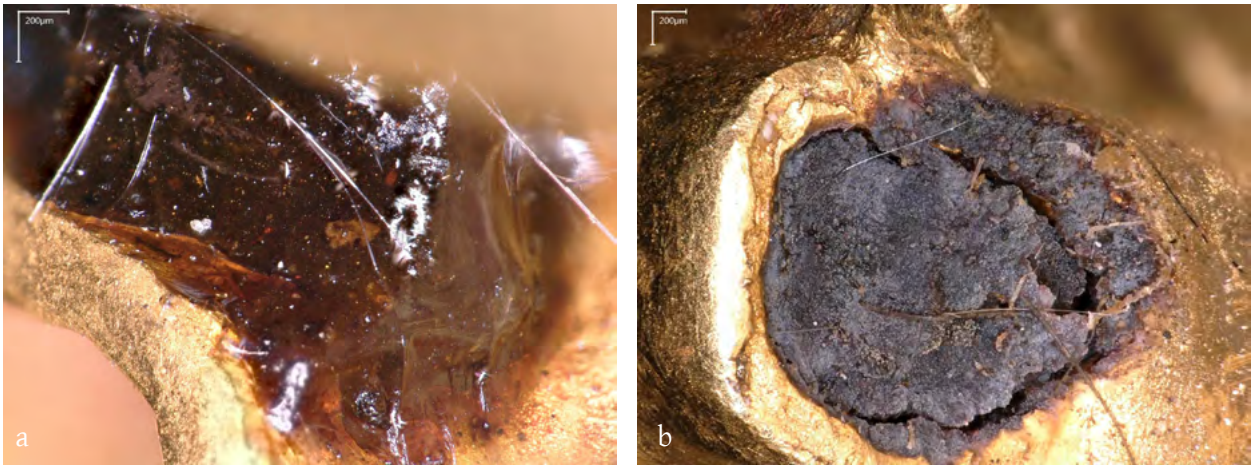

Figure 18. Dark red resin visible (a) in the cloisonné cells of the vulture's chest and (b) in the small loops on the vulture's tail feathers' rachis on aigrette Si 1727 1/131; note the different aspect of the two examples shown, which may be due to ageing during burial. This resin could have either been used as adhesive for inlays or as inlay material in its own right (photomicrographs: A. Mongiatti; (a) 150x, (b) 100x; scale: 0.2 mm)

from a small cast ingot. The low relief designs and decoration were then achieved using repoussé work and chasing (Figure 19).

Gold belt plaques

Out of the eight belt plaques studied, only one (Si 1727 1/6) has been worked by hand from a gold sheet. It shows rough hammer marks on its reverse side, created by the initial shaping of the sheet to create the relief (Figure 20). Interestingly, these hammering marks would have disappeared if further finer hammering had occurred,[21] which implies that only one stage of hammering was necessary to create the low-relief designs on this plaque. This is further emphasised by the rows of lightly punched hemispheres, also visible on the reverse but which do not appear on the front as decoration (Figure 21). These punched hemispheres seem to follow the outlines of the patterns in relief and were probably markers to guide the goldsmith when working the sheet from the back. This belt plaque shows damage in two areas: behind the horse's rear legs and on the base strip below the horse's front leg. Both damaged areas have been repaired in ancient times with small pieces of gold soldered to the reverse of the original gold sheet (Figure 22). At the front, a round-section wire in the shape of a hook, used to fasten one half of the belt buckle to the other, has been inserted into the sheet and its flattened end soldered at the

[21] Ute Sanne, goldsmith and jewellery, pers. comm., 2017.

Figure 19. Gold bridle fitting (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727 1/29): (a) photograph © V. Terebenin 2017; (b) front and (c) back showing the low relief designs and decoration achieved using repoussé work and chasing; a large Platinum Group Element (PGE) inclusion is also visible on the front (photomicrographs: A. Mongiatti; 20x, scale: 1 mm)

back, while, on the reverse, three thick gold strips were curved into loops and soldered, and used to attach or sew the plaque to the belt. It is highly likely that a fourth loop originally existed, located on the damaged top right at the back, but this is now lost. As with the aigrette, the gold sheet has been cut from the front to create the openings.

The remaining seven belt plaques studied (Si 1727 1/3, Si 1727 1/11, Si 1727 1/15, Si 1727 1/70, Si 1727 1/157, Si 1727 1/162 and Si 1727 1/242) show evidence of having been cast (Figure 23). Most of them are thicker and heavier than the hand-worked artefacts of comparable size. Several show clear dendritic structures on their front surface, especially

Figure 20. (a) Front and (b) back of the hammered gold belt plaque (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727 1/6), respectively having a smooth and shiny surface and a roughly hammered texture (a, photograph © V. Terebenin 2017; b, photograph: A. Mongiatti)

Figure 21. Back of the (a) horse eye and (b) monster rear paws on plaque Si 1727 1/6, showing a close-up view of the hammering marks and the unusual rows of lightly punched hemispheres, apparently outlining areas in relief at the front (photomicrograph: A. Mongiatti; 20x, scale: 1 mm)

Figure 22. Additional strip of gold soldered to the back of the sheet on plaque Si 1727 1/6, most likely to repair a damage in ancient times, either done at the time of manufacture or later during use (photomicrograph: A. Mongiatti; 20x, scale: 1 mm)

Figure 23. Cast gold belt plaques (The State Hermitage Museum, St. Petersburg): (a) Si 1727 1/11; (b) Si 1727 1/3; (c) Si 1727 1/70; (d) Si 1727 1/157; (e) Si 1727 1/162; (f) Si 1727 1/15 (left) and Si 1727 1/242 (right) (photographs © V. Terebenin 2017)

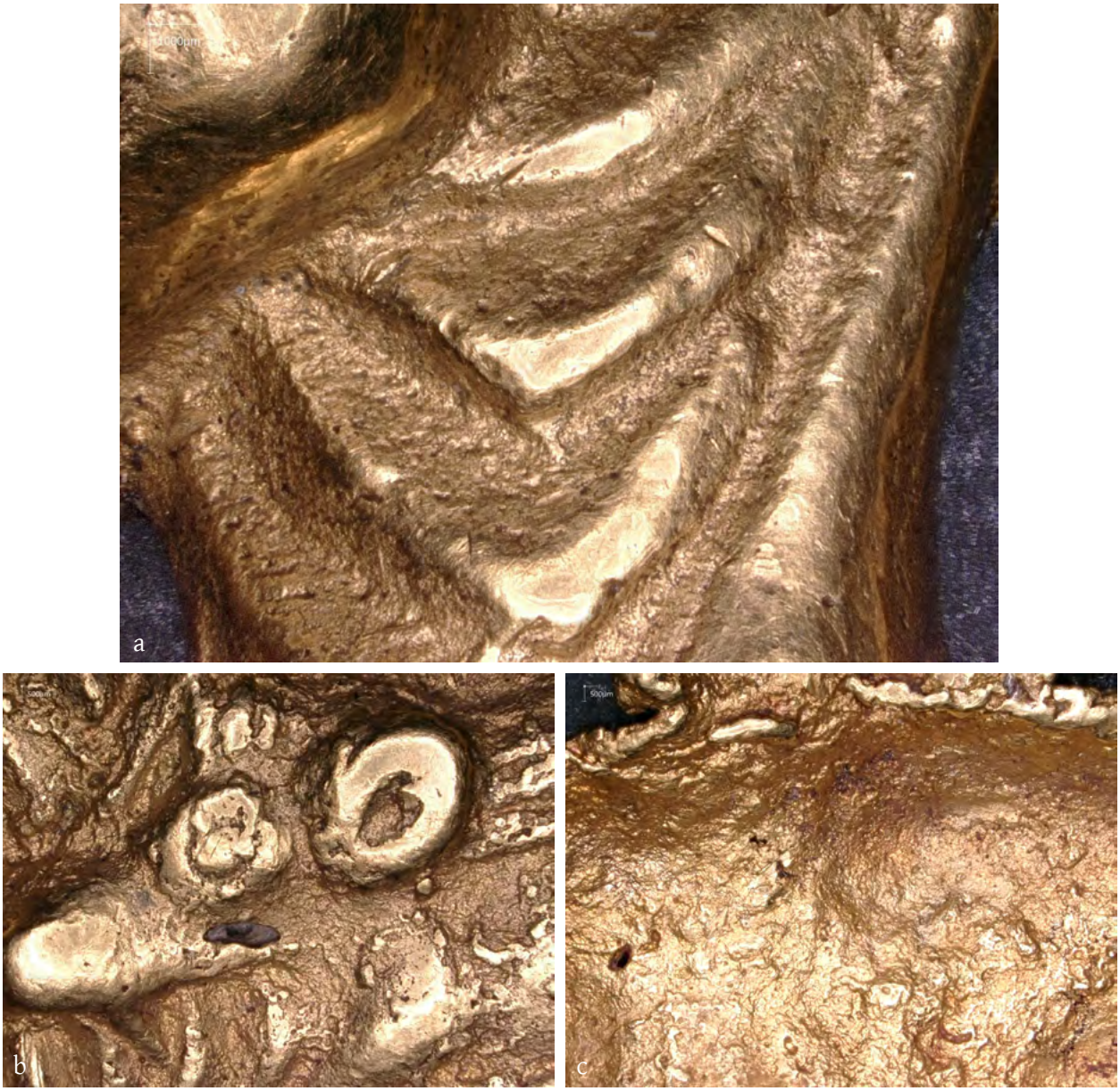

Figure 24. Dendritic structure on the surface forming upon cooling of the metal in the mould during a casting operation: front side of plaques (a) Si 1727 1/11 and (b) Si 1727 1/15 and (c) reverse side of Si 1727 1/242 (photomicrographs: A. Mongiatti; 20x, (a) scale: 1 mm, (b, c) scale: 0.5 mm)

in recessed areas, and one also on the reverse (Si 1727 1/242) (Figure 24); these dendrites grew upon cooling of the metal after it had been poured in a mould during the casting operation. Interestingly, the reverse of most belt plaques has preserved the positive impression of cloth (Figure 25): these would imply that one step or more in their manufacturing manufacturing process involved the use of woven cloth. The surface textures on the front and reverse sides of these plaques suggest that one part of the mould used in the casting process had the negative impression of the design to be cast in metal, while the other had the negative impression of woven cloth. There is a clear variety in the type of thread or weaving used (Figure 25), which may reflect local or workshop differences and suggest that this process was not necessarily standardised, as also observed by Bunker.[22]

These gold plaques show a wide variety of attachment devices, from hooks at the front and back to looped wires and square fastenings at the back; these appear cast in for three plaques (Si 1727 1/11, Si 1727 1/70, Si 1727 1/157) (Figure 26a) and soldered after casting for two plaques (Si 1727 1/3, Si 1727 1/162) (Figure 26b-c). The two smaller symmetrical plaques (Si 1727 1/15, Si 1727 1/242) do not bear any fastening system, either at the front or the back.

[22] Bunker 1988.

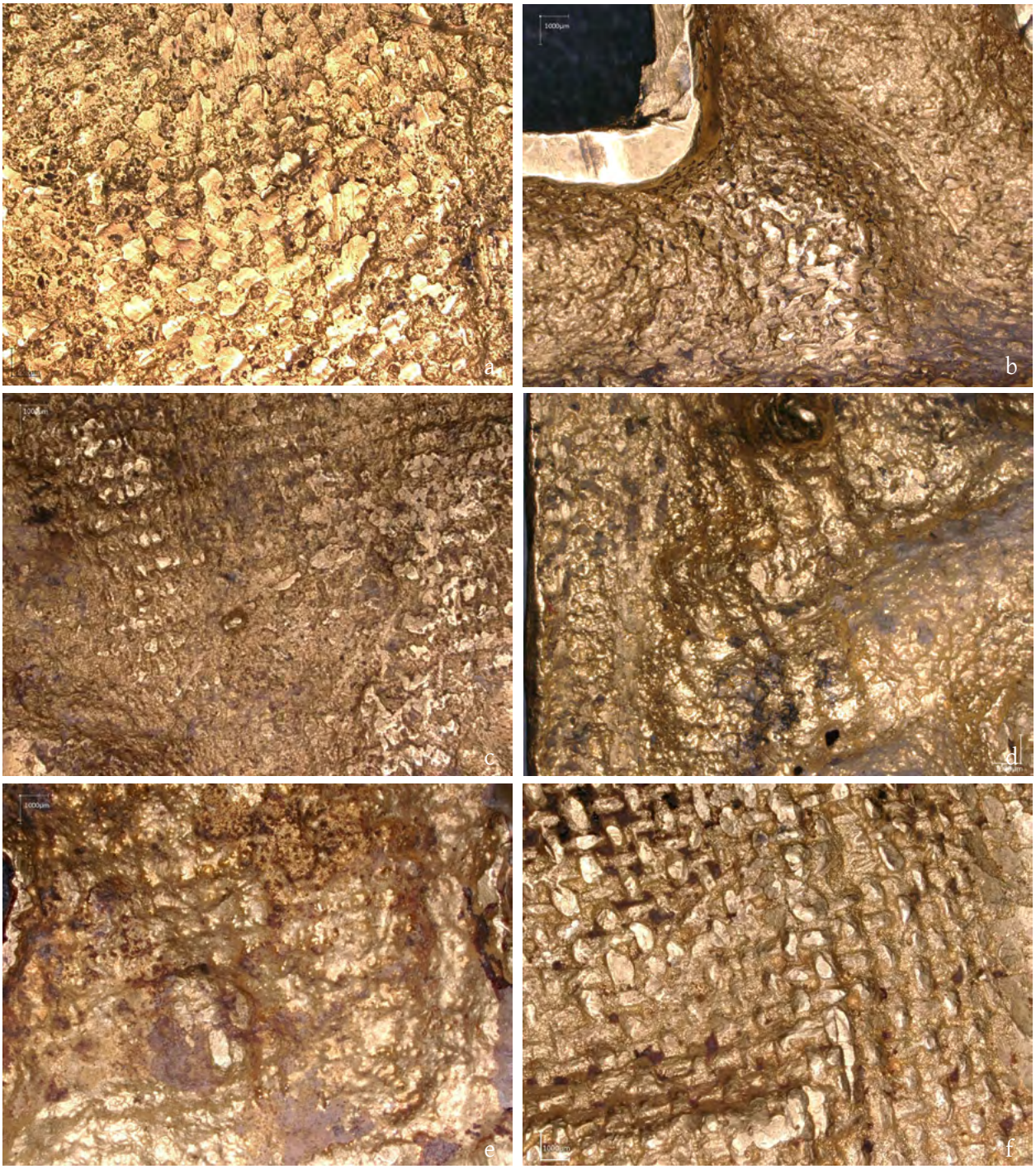

Figure 25. Cloth impressions on the reverse side of the cast belt plaques (a) Si 1727 1/3 (b) Si 1727 1/11, (c) Si 1727 1/15, (d) Si 1727 1/70, (e) Si 1727 1/157 and (f) Si 1727 1/162. Note the wide range of yarn thicknesses and types of weave, from a plain (or tabby) weave, e.g. (a, e, f), to a twill weave (c) (photomicrographs: A. Mongiatti; 20x, scale: 1 mm)

Several plaques do not show any post-casting hand-working, such as Si 1727 1/11, Si 1727 1/15 and Si 1727 1/242 (Figure 24), though most have been burnished in order to remove the dendrites and make the surface smooth and shiny (Figures 23a-d, 27a). The metal has also been chased after casting to enhance the three-dimensional designs (Figure 27). Three of the plaques display coloured stone and glass inlays, which contrast effectively with the gold (Figures 23, 28). The inlay cells were part of the original model and cast in, most likely chased by hand after casting to enhance their outline and relief (Figures 27–28). The inlaid materials sometimes vary on a single object: Si 1727 1/3 only contains turquoise inlays but Si 1727 1/70 and Si 1727 1/157 display both glass and semi-precious

Figure 26. Attachment loops at the back of cast belt plaques: (a) cast-in square hook on plaque Si 1727 1/70 and plaques Si 1727 1/3 and Si 1727 1/162 respectively (photomicrographs: A. Mongiatti; (a) 20x, scale: 1 mm, (b, c) 30x, scale: 0.5 mm)

stones. However, whether the latter reflect partial replacements for missing inlays or simultaneous inlaying is uncertain. Some of these inlays are now lost and reveal how the goldsmith prepared the cell prior to inlaying (Figure 29). Finally, most also display openwork holes, which had been cut through the gold plaque after casting.

The large belt plaque depicting a scene under a tree (Si 1727 1/162) is relatively low in relief and has a very different surface texture on the front compared to the other belt plaques (Figure 30). This texture could be the result of planishing after casting, which involves flattening and smoothing the surface using a smooth-faced hammer.[23] The goldsmith seems to have favoured this option instead of the more common burnishing of the surface visible on all the other artefacts; this choice is however not fully understood.

The plaque in the shape of a coiled panther (Si 1727 1/88), possibly a horse breast plaque, has been dated to the 7th century BC, slightly earlier than those discussed above (Figure 31). It has also been cast and must originally have been inlaid. There is no textile impression on its reverse (Figure 31b), which points towards the use of a more traditional casting technique, perhaps lost-wax casting. A relatively plastic material, such as wax or clay, was worked by hand to create the model with the shape and features of the animal. It was then bent into an annular shape and all parts of the curled animal were connected and secured by five small pieces of wax (Figure 31a), as also suggested and reproduced by Minasyan.[24] These connectors are still visible as gold rods on the final objects. The wax model then would have been encased in clay, after the addition of sprues, risers and vents to create a closed mould before molten metal was poured. After casting, the plaque was

[23] Untracht 1982: 254–56.

[24] Minasyan 2014: 158, 179–81.

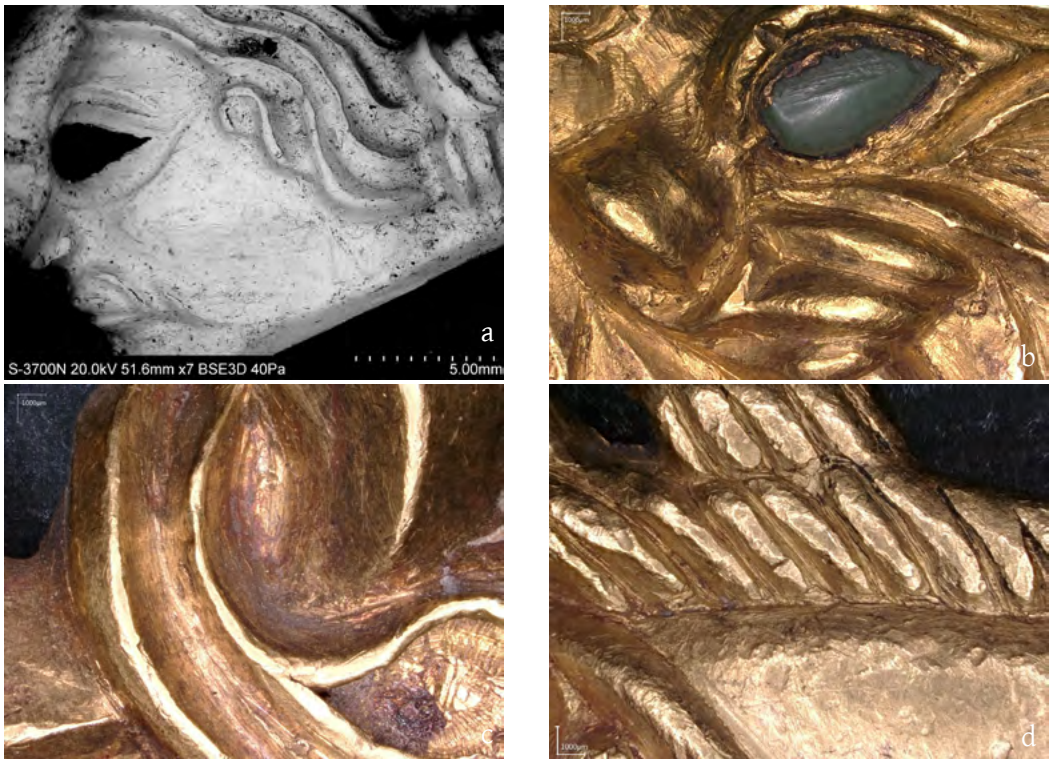

Figure 27. Detail of the post-casting chasing work enhancing the three-dimensionality of the designs and accentuating their contours; (a) SEM BSE image of plaque Si 1727 1/70, showing the smoothly burnished man's face and his finely chased hair and face features; (b) Chased feline whiskers, eye and nose on plaque Si 1727 1/3; (c) Chased mane and leaf-shaped empty inlay cell of the dragon on the left of plaque Si 1727 1/157. Note the dark red resin residue inside the inlay cell on the bottom right of the image; (d) Short parallel chased grooves on a horse's mane of plaque Si 1727 1/162 ((b-d) photomicrographs: A. Mongiatti; 20x, scale: 1 mm)

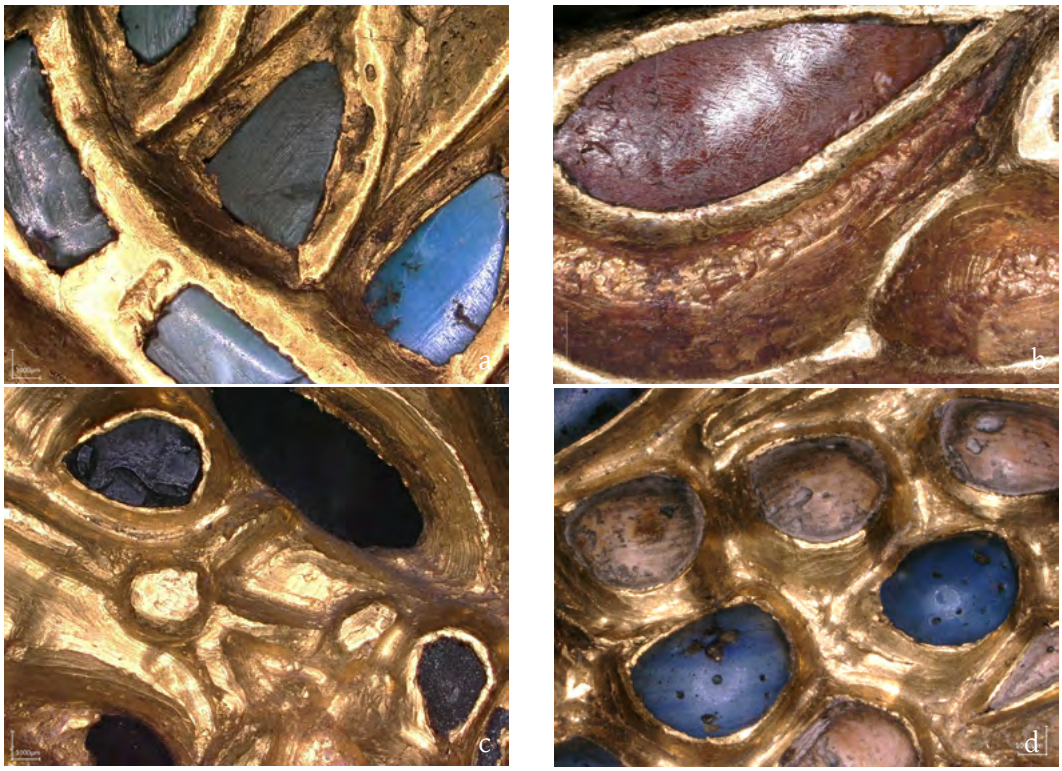

Figure 28. Examples of inlay materials: (a) turquoise on plaque Si 1727 1/3; (b) carnelian on plaque Si 1727 1/157; a mixture of (c) black stones[25] for the eyes and noses of men and animals, here the horse on the left, and of (d) blue glass and a possible organic inlay[26] on plaque Si 1727 1/70 (photomicrographs: A. Mongiatti; (a, c, d) 20x, (b) 30x, scale: 1 mm)

[25] Non-invasive Raman spectroscopy did not allow a clear identification of this material.

[26] It is hoped that future study and analysis of this partially white, pink and black material will enable its identification.

Figure 29. Empty inlay cells on plaques (a) Si 1727 1/70 and (b) Si 1727 1/157 revealing the uneven surface texture of the gold to facilitate inlaying (photomicrographs: A. Mongiatti; (a) 20x, scale: 1 mm, (b) 50x, scale: 0.5 mm)

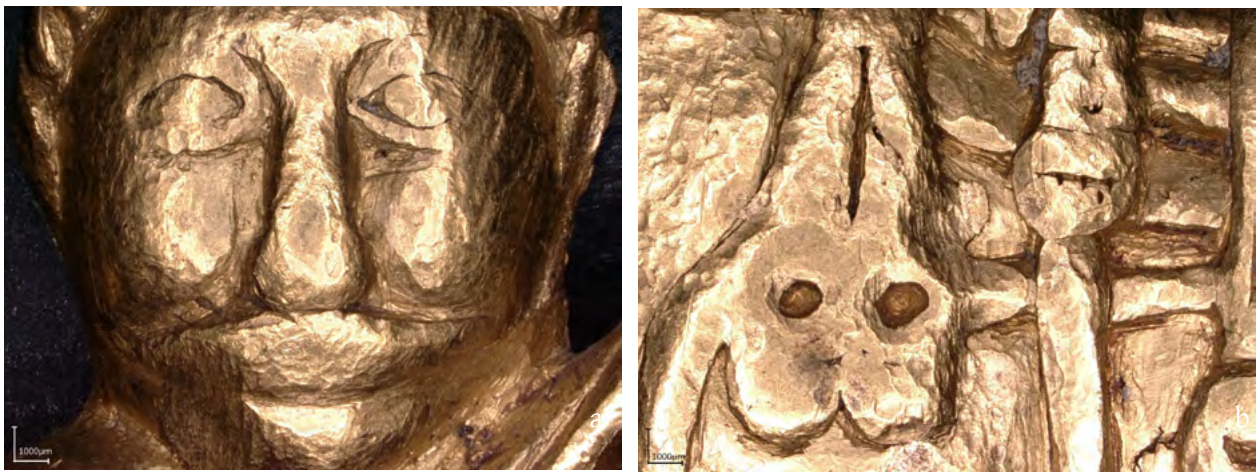

Figure 30. Surface texture of plaque Si 1727 1/162, most likely the result of intentional hammering, possibly for planishing: details of (a) the seated man's face and (b) the horse's harness (photomicrographs: A. Mongiatti; 20x, scale: 1 mm)

Figure 31. (a) Front and (b) back of the plaque in the shape of a coiled panther (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727 1/88): (a) photograph © V. Terebenin 2017; (b) image: A. Mongiatti)

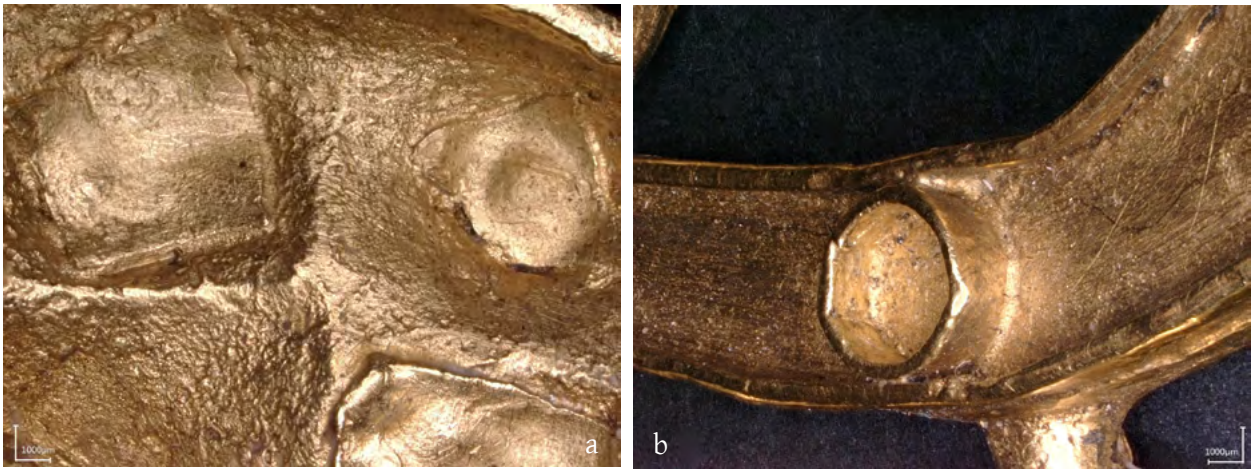

Figure 32. (a) View of the reverse side of the panther head on plaque Si 1727 1/88 showing small pieces of gold sheet soldered to the walls of cast-in holes to create inlay cells; (b) cloisonné cells on the panther's tail made of small strips of gold cut and bent to the desired shape and soldered to the front of the cast plaque (photomicrographs: A. Mongiatti; 20x, scale: 1 mm)

Figure 33. Coiled bracelet (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1727 1/55; photograph © V. Terebenin 2017)

burnished judging by its very smooth and lustrous surface. It was also cut in places to create some openwork and three thick strips of gold were bent into an annular shape and soldered to the back of the plaque for attachment (Figure 31b). An unusual feature is the combination of inlay cells originally cast as open holes, which were subsequently sealed at the back with small pieces of gold sheet (Figure 32a), in addition to cloisonné cells added after casting (Figure 32b). Cloisonné cell walls have been created by soldering strips of gold of various sizes and bent into the desired shapes onto the front of the cast plaque. Presumably both types of cells once held inlays but none now survive.

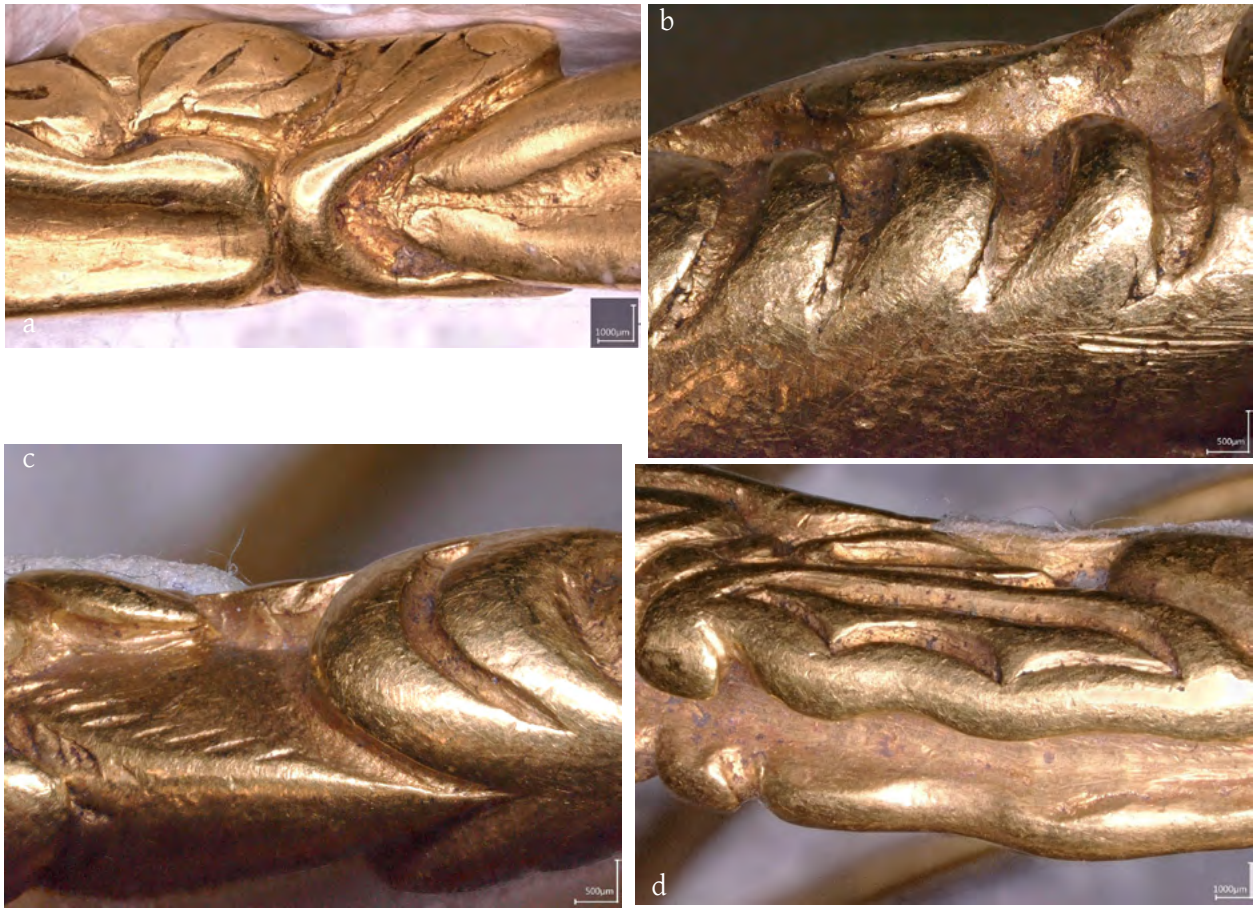

Figure 34. Detail of the decoration on the terminals of bracelet Si 1727 1/55 with (a, b) as-cast dendritic surface structure in several areas and (c, d) grooves further chased after casting (photomicrographs: A. Mongiatti; (a, d) 20x, scale: 1 mm; (b) 50x, scale: 0.5 mm; (c) 30x, scale: 0.5 mm)

Figure 35. Reverse sides of plaques (The State Hermitage Museum, St. Petersburg): (a) Si 1727 1/11 and (b) Si 1727 1/157, respectively showing thick, flat and smooth openwork edges, which match the traces of wear visible on the front of the former plaque, compared to the sharp and as-cut openwork holes, which on the contrary match the absence of any signs of wear on the front of the latter (images: A. Mongiatti)

Gold coiled bracelet (Si 1727 1/55)

This bracelet also associates casting and hand-working: the body wire was hammered into shape from a cast gold ingot while the two solid zoomorphic terminals were cast separately and soldered onto the wire (Figure 33). The finer decoration on the cast terminals has been partially chased (Figure 34). Many similar bracelets in the Siberian collection of Peter the Great were possibly made in the same way

(e.g. Si 1727 1/52, Si 1727 1/54), as were most likely contemporary Achaemenid examples in the Oxus Treasure.[27]

Traces of wear on the belt plaques

The extent of wear visible on the belt plaques is highly variable: some of them show no traces at all while others are clearly worn. Large plaques, such as Si 1727 1/70, Si 1727 1/157, and Si 1727 1/3, which do not show any wear and have fine post-casting work and coloured inlays, may have been commissioned for a Scythian burial of high social status. The wear on as-cast plaques is more difficult to identify as their designs are not as sharp and well defined due to the dendritic surface texture, but areas in relief, which are very smooth and shiny, do suggest wear. It may also be possible to distinguish whether a plaque has been worn from the appearance of the edges of the openwork at the back. These are thicker, flatter and smoother at the back of the plaques with signs of wear on their front (Figure 35a) than on the ones without (Figure 35b); this wear at the back is most likely due to the rubbing of the plaques against the material to which they were attached while being worn.

Discussion

The selection of artefacts from the Siberian collection of Peter the Great studied here illustrate a wide range of goldsmithing techniques, known from various parts of the Scythian world and in the different cultures they encountered in the west, south and east from better provenanced material. Notably, there is clear evidence of both cast gold artefacts and hand-worked gold appliqués from the recently excavated 7th century Scythian burial of Arzhan-2: numerous small feline-shaped plaques are both cast and punched, a large number of composite artefacts are made of wires and sheets produced by plastic shaping and assembled through mechanical means and soldering, while a large waist buckle and clasps are cast.[28] Similarly, a pair of solid cast bangles has been found together with numerous hand-worked plaques and pieces of jewellery in the burial mound of Taksai-1 in western Kazakhstan, dated to the 6th or 5th century BC.[29] Additionally, various decorative plaques and appliqués from contemporary Scythian sites, such as Filippovka in the southern Urals, and Solokha and Chertomlyk in Ukraine, were produced from sheet, either punched or pressed into dies,[30] as were those from the 8th–7th century BC site of Chilikty in Kazakhstan.[31]

Repoussé work, chasing, and punching were gold working techniques clearly mastered by Classical Greek and Achaemenid goldsmiths and appear relatively consistent between these two traditions by the mid-1st millennium BC.[32] Greek gold jewellery artefacts are rarely cast,[33] and instead are usually made of multiple hand-worked components,[34] similar to Achaemenid pieces, as seen for instance in the Oxus Treasure[35] and excavated jewellery from Pasargadae in Iran.[36] The hand-worked objects in this study from the Siberian Collection of Peter the Great, which are stylistically related to these two cultures, also illustrate this.

Plastic shaping of a gold sheet could either be done by hammering it freely into shape or pressing it down into a die with either a positive/raised or a negative/hollow[37] design. Other possibilities would be to work the gold sheet over a positive former or strike it with a punch. The side of the gold sheet in contact with the die or punch would most likely show the sharpest marks and outlines; although chasing on the obverse side after impressing the pattern could possibly alter this difference, by concealing the initial stamping or punching marks or on the opposite accentuating the lack of these. Although it is easier to press and work gold into recessed areas than to force it into relief over a positive former,[38] the archaeological record has yield both negative dies and positive formers, as early as the 3rd millennium BC in the Near East.[39] In particular, a large collection of bronze formers dating to the second half of the 1st millennium BC was found at Galjûb in Egypt,[40] while a bronze former in the shape of a standing female was discovered as part of the Lydian Treasure.[41] Besides, a variety of ancient vessels, such as the fluted vessel discussed here and a contemporary jug from the Oxus Treasure,[42] appear to have been raised from a single sheet of gold, further emphasising the skills of the ancient goldsmith to

[27] Dalton 1964: 32–38, cats 116–43, pls XVII–XX.
[28] Chugunov, Nagler and Parzinger 2006*b*; Armbruster 2009; 2010.
[29] Sdykov and Lukpanova 2013: 148–201; Myngbay *et al.* 2016: 170–89; Satubaldin *et al.*, this volume.
[30] Yablonsky 2013; Aruz *et al.* eds 2000: 160–63, 229–33, cats 98–100, cats 160–62; Simpson and Pankova eds 2017: 150, cat. 89.
[31] Aruz *et al.* eds 2000: 250–51, cat. 172; Simpson and Pankova eds 2017: 145, 147, cats 82, 85.
[32] Williams and Ogden 1994: 29.
[33] Williams and Ogden 1994: 28.
[34] Williams and Ogden 1994; Williams ed. 1998.
[35] Mongiatti, Meeks and Simpson 2010; Mongiatti 2017; 2018.
[36] Stronach 1978: 168–77, figs 85–89, pls 153–57a–b; Curtis and Tallis eds 2005: 144–45, cats 172–75.
[37] Hollow shapes cast or carved into dies have also been called intaglio motifs by other jewellery specialists in the context of Classical goldsmithing (Ogden 1982; Williams and Ogden 1994).
[38] Patrick Davison, goldsmith and jeweller, pers. comm. 2018.
[39] Ogden 1982: 36–38; Treister 2001: Classical hollow stone and bronze dies 81–84, Hellenistic hollow bronze dies 173–75, hollow bronze die with Achaemenid motifs 236–47, hollow dies and positive formers from Galjûb, Lucania and Illaria 280–96.
[40] Ippel 1922; Treister 2001: 253–73.
[41] Özgen and Öztürk 1996: cat. 192; Williams ed. 1998: col. pl. 8.
[42] Dalton 1964: 8, cat. 17, pl. VII (BM 123918); Curtis and Tallis eds 2005: 124, cat. 125; Simpson and Pankova eds 2017: 301, fig. 168.

work gold sheets in various ways. Finally, punches have been found since the 2nd millennium BC[43] and were generally used to create repetitive motifs; numerous examples of small punched Scythian gold appliqués have been found archaeologically. All the goldsmithing techniques explained above could however result in the same tool marks on the finished artefacts and some could conceal previous ones; it would be virtually impossible to identify the exact process used to shape a gold sheet if the back of the sheet was not visible.[44] This is why in this study, in the case of complete hollow features made of two halves, it has not been specified whether for each half a positive former or a negative die or mould was used. It is hoped that further study of these and other artefacts will bring more light on this specific question.

Unlike the three-dimensional features or artefacts made of two halves, the reverse of one-sided plaques is visible. Tool marks and impressions on both sides of the gold sheet of the plaques of Peter the Great's Siberian Collection showed that most were cast, with the exception of one most likely having been hammered freely from the back along lightly punched relief outlines. Although there is only one example known from this collection, repoussé work may not have been such an unusual technique, as evidenced on several gold artefacts, some with the same motif, from 1st century Tillya tepe. These artefacts seem to display subtle differences between each of them, suggesting that they were not made from the same punch, former or die but each sheet was individually worked and shaped.[45] Repoussé work has also been noticed on the 6th century BC plaque and sheath from the Vettersfelde Treasure.[46] On the other hand, many plaques and appliqués with the same pattern have clearly been made using the same punch, die or mould, as shown by Treister when comparing gold plaques and *gorytoi* decorative patterns from many Scythian burials,[47] and by the thousands of small feline appliqués from Arzhan-2 mentioned above.[48] In the case of plaques from Taksai-1 and Issyk in Kazakhstan, published images of obverse and reverse sides may even make it possible to identify whether the sheet was pressed into a negative die or onto a positive die. Several plaques from the Issyk burial seem to show sharper lines and marks on the front, which would suggest that the gold sheet was pressed into a negative die or mould,[49] while others display the opposite pattern, suggesting the use of a punch or a positive die.[50] Similarly in Taksai-1, oval and square griffin-sheep shaped plaques were possibly punched or pressed into a positive die, as the features and outlines on the front appear much less sharp than on the back and there is no apparent sign of chasing after striking the gold sheet onto the pattern.[51] Conversely, the reverse sides of small swastika-shaped plaques appear less sharp than the front; they may therefore be more likely to have been produced by pressing the gold sheet into a negative die or mould.[52] These hypotheses could however only be verified by studying these artefacts under a microscope.

As seen, the use of moulds/dies or punches is generally associated with the production of series of repetitive patterns. There is however evidence of unique designs, such as the decoration on the quiver and the wooden bowl handle from Arzhan-2[53] or the gold appliqués from Great Bliznitza.[54] It is therefore possible that the halves of intricate three-dimensional animal features, such as the vulture's neck and head on the aigrette (Si 1727 1/131) or the feline terminals on the torc (Si 1727 1/62) and the fluted vessel (Si 1727 1/71), were shaped by pressing a sheet of gold into a die/mould or hammering it over a positive former. Cast bronze formers and punches from the Lydian Treasure find their counterpart in unique gold jewellery artefacts. Some of these tools seem to even have been used both as punches and formers, further emphasising the difficulty in interpreting the marks left on a finished artefact. Some formers display lines in places where the gold sheet would have needed to be cut in half.[55] 5th century BC lion heads on drinking horns from the Maikop Treasure, northwest Caucasus and on Achaemenid-style bracelets from Crimean Nymphaeum also appear to have been made from separate halves worked on positive formers.[56] Greek-style boat-shaped earrings and necklace pendants from the latter site made from two halves could have also been produced using a die or a former.[57] Besides, some Classical pieces of jewellery have been found to retain their wood or stone former inside,[58] these were however not necessarily produced in series. Hollow artefacts with no inner former would have required the use of a filler in order to chase and punch the finer details or refine pattern outlines on the front of the gold sheet without damaging it. These fillers could be of a variety of resilient materials, such as

[43] Ogden 1982: 37.
[44] Williams and Ogden 1994: 18–19, 30.
[45] E.g., Sarianidi 1985: ills. 38, 81–84, 86, cats 1.1, 3.1, 3.15; Mongiatti, Meeks and La Niece 2011.
[46] Ogden 1982: 35; Redfern 2000; 2012: 34–37.
[47] Treister 2001: 127–60.
[48] Armbruster 2009; 2010; Simpson and Pankova eds 2017: 149, cat. 87.
[49] Akishev 1978: pls 19–20: Myngbay *et al.* 2016: 124–25.
[50] Akishev 1978: pls 3–4; Myngbay *et al.* 2016: 104–107.
[51] Sdykov and Lukpanova 2013: 148–51; Myngbay *et al.* 2016: 176.
[52] Sdykov and Lukpanova 2013: 152–53; Myngbay *et al.* 2016: 177.
[53] Armbruster 2009; 2010.
[54] Williams and Ogden 1994: 194–95, cats 127–29.
[55] Öztürk 1998.
[56] Redfern 2012: 47, 72.
[57] Williams and Ogden 1994: 132–34; Redfern 2012: 71.
[58] Ogden 1982: 39.

resin, beeswax, clay, sand or a mixture of several of these, or even sulphur, which would absorb the shock from the deformation of the gold sheet.

The small selection of artefacts studied has not shown the use of filigree or granulation; it was however part of the corpus of decorative techniques extensively used by Eurasian nomads. Numerous archaeological artefacts with such elements of decoration cover the whole territory of Eurasian nomads from the east at Pazyryk in the Altai mountain region[59] and Taksai-1 in Kazakhstan[60] for instance, to the west in the rich burials from the northern Black Sea region[61] and southern Ukraine (e.g. Tolstaya Mogila, Chertomlyk, Solokha). It is interesting to note that by this time, decorative techniques on fine sheet work including granulation were back in Greek jewellery following influence from the Achaemenid empire after having disappeared for a few centuries at the beginning of the 1st millennium BC.[62] Either culture or both would have then been able to influenced Scythian gold work by the middle of the 1st millennium BC, either through encounters with actual craftsmen or exposure to their gold jewellery.

Different types of coloured inlays made of stone and glass and used on both cast and hand-worked artefacts were intended to contrast with the gold, as shown by the present selection. Other archaeological examples of inlaid gold artefacts, both Achaemenid in style, were found in the Scythian burials of Arzhan-2[63] and Taksai-1.[64] Turquoise inlays in particular were very much favoured by the Scythians; they are often found in Achaemenid and Greco-Bactrian jewellery but very rarely in Classical and Hellenistic Greek gold ornaments,[65] illustrating how Eurasian nomads were constantly adapting specific techniques and styles to their own traditions and know-how.

Another process incorporated into the corpus of Scythian gold working techniques and used to create exquisite low-relief plaques was casting. As shown above, all but one of the gold belt plaques studied were produced using this technique, with most also showing the use of woven fabric involved in some way in the process. It has been suggested in the past that the textile was either used as a backing to the thin wax model, which would reinforce it and reduce the quantity of gold necessary for casting,[66] or as a substitute for wax within the mould.[67] While the latter hypothesis has been successfully reproduced experimentally,[68] no other possible and practical alternatives have been tested, e.g. combining wax with cloth in the casting mould as suggested by Bunker.[69] On the other hand, Bunker argues that a wax model was essential to achieve the relief features but assumes that both wax and cloth were necessarily used together.[70] The evidence gathered during this study has not been able to confirm either of these two possible hypotheses and it is hoped that future excavations uncovering contextualised archaeological material and casting experiments will help. The full *chaîne opératoire* of this rather atypical process and the reason for its selection over more traditional casting techniques for these specific artefacts have yet to be fully understood.

Cast low-relief plaques are frequently found at sites on the Eurasian steppe,[71] including gold and silver plaques bearing similar cloth impressions[72] as the plaques from the Siberian Collection of Peter the Great. However, outside this collection, virtually no other contemporary Scythian archaeological artefacts display traces of this peculiar process and most known examples were discovered in northwest Chinese contexts linked to the Yuezhi / Xiongnu cultures.[73] Only one pair of gold shoe buckles bearing cloth impressions on the backs was discovered in a 1st century burial at Tillya tepe,[74] and attest casting using cloth. Interestingly, the design of the finished item is stylistically Chinese and, although it is likely that this artefact was imported,[75] it is possible that the technique arrived in Bactria with the Yuezhi, when they were forced to move out of Gansu towards the end of the 1st millennium BC. In a similar way to the western regions of the Eurasian steppes, exchange and transfer of knowledge and skills most likely occurred at some point in time between the various cultures living in northwest China and southeast Siberia, as seen in the Gansu province in the early 2nd millennium BC,[76] and was probably a relatively continuous process. Casting of gold artefacts, combined with hand-working, was also used in contemporary western European cultures, to create complex artefacts, such as the Iron Age torcs from Snettisham and Ipswich.[77] A negative

[59] Simpson and Pankova eds 2017: 136, 142, cats 66, 75.
[60] Sdykov and Lukpanova 2013: 160–81, 192–201; Myngbay *et al.* 2016: 178–84; Simpson and Pankova eds 2017: 137, cat. 67.
[61] Williams and Ogden 1994: 122–98.
[62] Ogden 1998.
[63] Simpson and Pankova eds 2017: 136, cat. 66.
[64] Sdykov and Lukpanova 2013: 182–87; Myngbay *et al.* 2016: 170–73; Simpson and Pankova eds 2017: 303, cat. 218.
[65] Ogden 1992: 38.
[66] Bunker and Ternbach 1970; Bunker 1988.
[67] Minasyan 2014: 216–21.
[68] Minasyan 2014: 216–21.
[69] Bunker and Ternbach 1970; Bunker 1988.
[70] Bunker 1988.
[71] Bunker *et al.* eds 1997; Boardman 2010.
[72] Bunker 1988; 1992.
[73] Bunker 1988; 1992.
[74] Hickman 2012; Aruz and Valtz Fino eds 2012: 84–85, 112–13; cf. Sarianidi 1985: ill. 124, cat. 4.1; Hiebert and Cambon eds 2011: 266–67, cat. 187.
[75] Francfort 2012.
[76] Linduff 2006.
[77] Meeks, Mongiatti and Joy 2014.

aspect of casting is the need for higher quantities of precious metal than for punching or hammering sheets, thus it may not have been sustainable for the goldsmithing craft and even irrelevant for smaller pieces of personal adornment, except in rare cases. It also appears difficult for the goldsmith to cast an artefact from a specified or given weight of gold due to the addition of sprues, which would also be filled with gold and potentially take as much metal as the designated casting.[78] Although there may have been gold readily accessible at that time, for instance in the form of now-disappeared placers or exploited primary deposits in 1st millennium BC Kazakhstan and the Altai region,[79] the apparently higher overall number of hand-worked gold sheet artefacts compared to cast objects in the archaeological record may reflect this difference in quantity of raw material needed to manufacture finished artefacts. Another explanation may be technological in the easier and greater control the goldsmith has on hand-working techniques over casting, which also requires hand-work afterwards, to achieve the very intricate designs they were after. Finally, choices might have also or otherwise been dictated by the limited availability of fuel for casting or clay to make furnaces, crucibles and moulds.

The wide array of goldsmithing technologies testifies of the rich contacts, which the Eurasian nomadic tribes had with their neighbours, such as the settled Persians/Achaemenids and Greeks in the south and west and the eastern Asian nomadic pastoralists, such as the Yuezhi or Xiongnu, in the east, through trade or conflict. Over the years, these encounters will have led not only to the trade of finished gold artefacts, and thus exposure to new motifs and designs, but also to the exchange of knowledge and skills in the field of goldsmithing. This has therefore created a fusion of both styles and techniques, now reflected in Scythian archaeological artefacts.

Conclusions

The scientific study and analysis of this selection of gold artefacts from the Siberian Collection of Peter the Great has added to the corpus of existing knowledge and brought new data to active discussions related to their manufacturing technology. Two distinct groups have been identified through the microscopic study of their tool marks: objects made of multiple components of gold sheet and wire and cast plaques of various sizes. The hand-worked multi-element artefacts fits into the well-established tradition known in the Classical and Achaemenid cultures, while casting forms part of a long-standing metalworking practice across eastern Asia and was broadly used at the time, although more in the context of bronze production. An interesting peculiarity of the casting technique employed in the manufacture of these gold plaques was the use of a piece of woven fabric in the mould at some point in the process.

This variety of goldsmithing techniques suggests close contact between neighbouring cultures, which would have allowed exposure to different styles and iconographies and assisted exchange and transfer of knowledge and skills between craftsmen. It is however difficult to identify for certain whether the plaques, for instance, reflect northwest Chinese imports, products of itinerant craftsmen from northwest China or of Scythian goldsmiths, who would have learnt from the former and adapted their technique to create their own gold artefacts. Comparably, the hand-worked artefacts find their counterpart, either technologically or stylistically, in Classical and Achaemenid assemblages: hence the same questions about their maker arise. The only clear pattern is the apparent link between eastern style and casting technology versus western and southern styles and hand-working processes. However, although the choice in manufacturing technology seems to match the stylistic origin of these artefacts, their gold alloy composition does not appear to help in the identification of a specific provenance.[80] Besides, many questions regarding the metal-working technologies documented here remain: how was the piece of woven cloth precisely used in the casting process? What was its exact role in the process? Was the dark red resin recorded on a number of artefacts a feature of the manufacturing process? Was it an ancient adhesive or an inlay material in its own right? It is hoped that the ongoing collaborative research between the British Museum and the State Hermitage Museum will add more answers in the future.

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[78] Ogden 1991.
[79] Williams and Ogden 1994: 13.
[80] The elemental composition of the gold alloys has been analysed non-invasively and superficially by X-ray Fluorescence. The results will be published separately.

here as well as helping with their interpretation, and to Joanne Dyer (Colour Scientist at the British Museum) for her expertise in gemstones and help with the preliminary non-invasive study of the unknown resin. Finally, Nicole Reifarth is warmly thanked for her precious information on textiles and the identification of the types of weaving from their impressions on the back of the cast belt plaques.

Life and death in the Scythian world of southern Siberia: a social bioarchaeological study of the mobile pastoralists from Aymyrlyg

Eileen Murphy,[1] Yuri Chistov[2]

Abstract

The cemetery complex of Aymyrlyg, located in Tuva in southern Siberia, has yielded one of the most substantial and thoroughly analysed populations of the later Scythian world. The scientific evidence derived from the remains has enabled more nuanced understandings to be gained in relation to many aspects of their lives, including funerary practices, diet and subsistence strategies, health status, violence, as well as attitudes towards physically impaired individuals. The paper will review some of the main findings that have been gained in relation to these fascinating mobile pastoralists.

Keywords: Iron Age; Eurasia; Herodotus; body processing; diet; health; trauma; violence; care

Introduction

The study of human skeletal remains and their burial environments enables archaeologists to gain compelling insights about the lives and deaths of the people who lived in the past. The trials and tribulations of daily life, including evidence for disease and violence, all leave tell-tale signs in the bones and can also inform about inter-personal and inter-group relationships. Bioarchaeological research is a valuable methodology for studying the impact that large-scale socio-political, environmental and economic processes may have had on the health and well-being of archaeological populations.[3] When the bioarchaeological evidence derived from human skeletal remains is positioned within a strong cultural framework the resulting information can be particularly rich. This is a social bioarchaeological approach and its goal is to 'transcend the skeletal body into the realm of lived experience and to make a significant contribution to our understanding of social processes and life in the past'.[4]

The cemetery complex of Aymyrlyg, located in southern Siberia, has yielded one of the most substantial and thoroughly analysed populations of the later Scythian world. In Book 4 of his *Histories*, the 5th century BC historian Herodotus led us to believe that Iron Age populations of Scythia were highly nomadic and extremely violent.[5] Modern bioarchaeological research on the human skeletons derived from Aymyrlyg has somewhat corroborated aspects of his writings.[6] The scientific evidence derived from the remains has enabled more nuanced understandings to be gained in relation to many aspects of the lives of these people, including diet and subsistence strategies, attitudes towards physically impaired individuals, weaponry and the nature of violent death, as well as funerary practices. This paper will review some of the main insights that have been gained in relation to the Scythian people interred at Aymyrlyg and explore the implications of these findings for furthering our understanding of the nomadic populations of Eurasia more broadly.

The cemetery complex of Aymyrlyg is located in the Ulug-Khemski region of Tuva, deep in southern Siberia and near the border with Mongolia (Figure 1). It spanned a vast distance of some 10 km and was located alongside a tributary of the mighty Yenisei river. It was excavated over a 16 year period between the 1960s and 1980s by Dr A.M. Mandelshtam and Dr E.U. Stambulnik of the Sayano-Tuvinsky expedition team from the Institute of the History of Material Culture in St. Petersburg because the entire zone was scheduled to be flooded as part of the workings of a hydro-electric power station. The human skeletal remains were brought to the Department of Physical Anthropology of the Kunstkamera Museum. A detailed osteoarchaeological and palaeopathological analysis was undertaken of the population for PhD research[7] and this study has formed the basis for additional and ongoing projects. Approximately 800 individuals were recovered from the burial ground – most of the earlier 607 interments dated to between the 5th and 2nd

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[3] Perry 2007: 486.
[4] Agarwal and Glencross 2011: 3.
[5] Herodotus, *The Histories* 4.1–144.
[6] Murphy 2004.
[7] Murphy 1998.

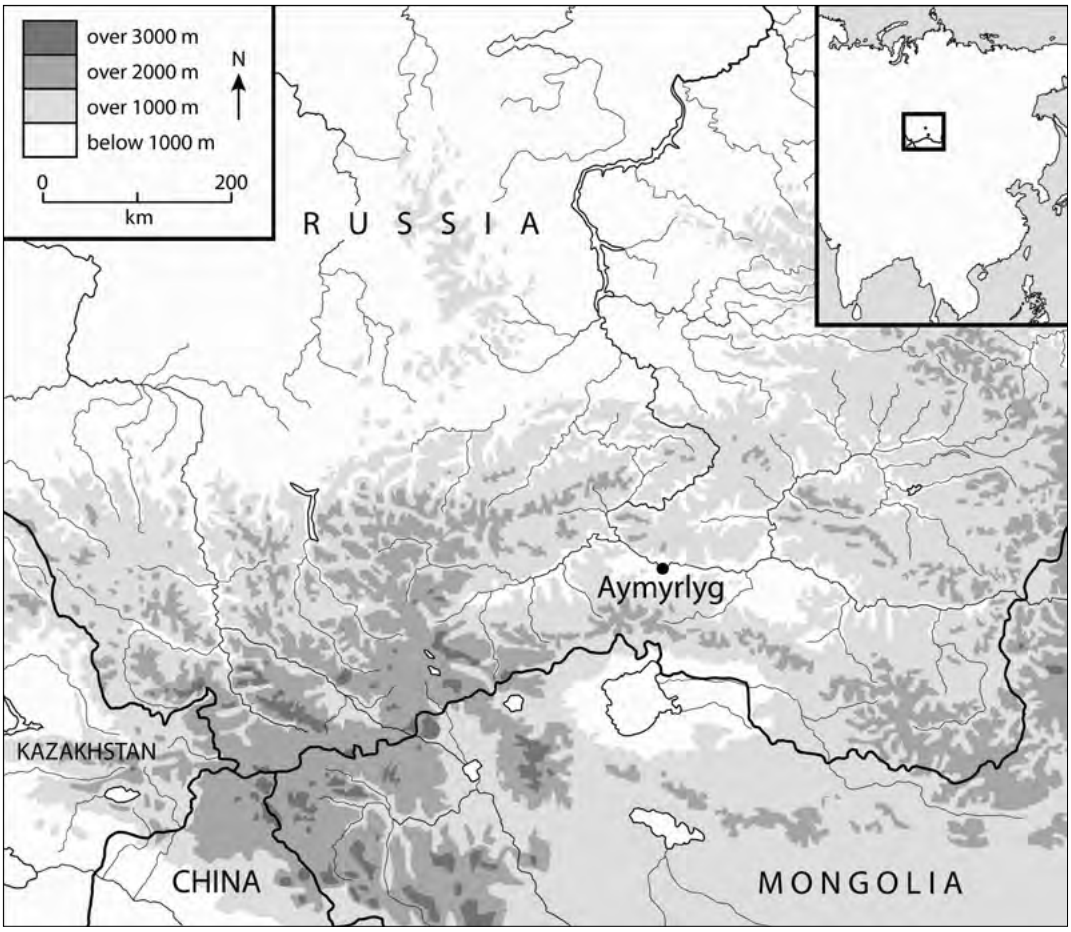

Figure 1. Map showing the location of Amyrlyg
(drawing by Libby Mulqueeny)

centuries BC and were attributed to the Uyuk culture of the later Scythian period.[8] The remainder of the population were derived from the Shurmak culture of the early Hunno-Sarmatian period and was associated with the expansion of the Xiongnu empire into Tuva.[9] Given the theme of the volume, this paper will largely focus on the Scythian population.

Funerary practices and the mobile pastoralist way of life

The Scythian burials at Aymyrlyg were located at the edge of the river terrace and were distributed in chains which ran along the riverside. The exterior of each tomb generally comprised a low rectangular wall composed of stone slabs sunk edgewise into the ground. The size of the wall was dependent on the size of the underlying grave which in turn was reliant on the number of individuals buried within the tomb. The most characteristic interior structure used was the rectangular log house tomb, the walls of which were composed of logs and with a ceiling made from thinly chopped logs. The wooden structures were placed within deep pits dug into the ground. The numbers of individuals buried within an Aymyrlyg log house tomb was considerable, with as many as 15 skeletons being recovered from individual examples. Stone cists were also used during this time – the majority of which were small, with room only for the burial of a single individual, most of whom were children.[10]

The bodies were laid out in rows within the log house tombs (Figure 2). Although some variations were evident, the dominant burial rite involved the placement of the person on their left side with their legs flexed, and the head to the north. Two components of the 'Scythian triad' – characteristic weapons and artefacts decorated with the 'Animal Style' of artwork – were well represented among the Aymyrlyg grave goods but objects associated with horse riding were only occasionally recovered. The people of Aymyrlyg seemed generally well provisioned for the afterlife, and their graves contained a range of everyday tools, household items and foodstuffs. Personal items, including combs and mirrors, were also present. Remnants of clothing preserved by their association with metal objects, suggest they would have worn an outer layer of clothes

[8] Mandelshtam 1992: 185.
[9] Davydova 1996: 159; Stambulnik 1983: 34; Murphy 2012.
[10] Mandelshtam 1983: 26.

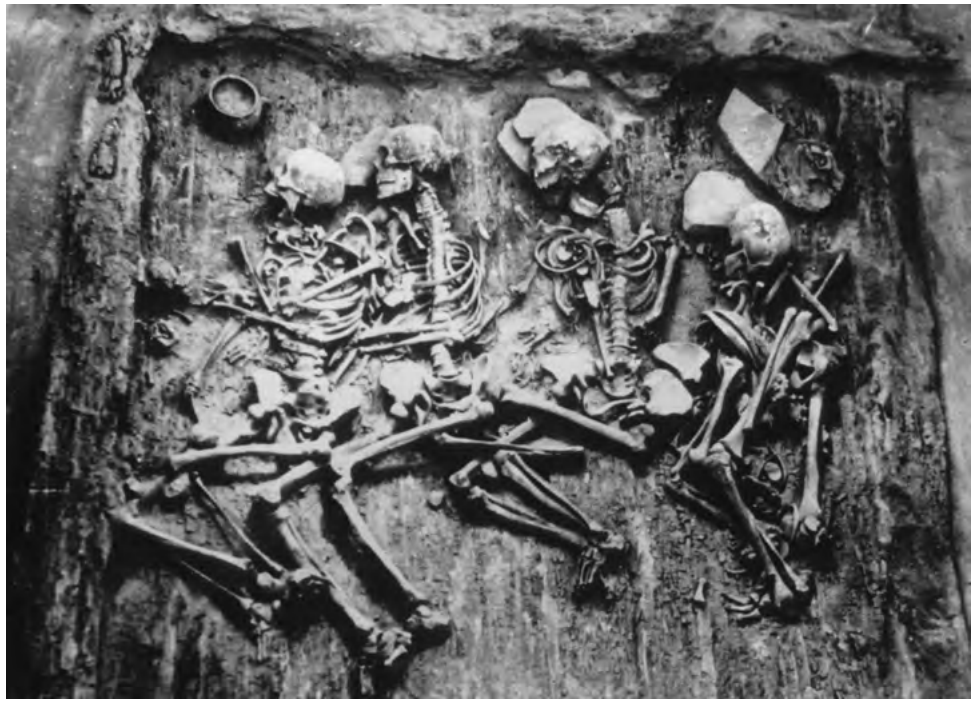

Figure 2. Log house tomb VI. 6 from Aymyrlyg (photograph: courtesy of the Photographic Archive of the Institute for the History of Material Culture, St. Petersburg)

made from leather and fur, with an inner layer made from a woollen fabric. There are hints they would have worn belts from which numerous items would have been suspended. Gold and bronze earrings and bracelets were occasionally encountered, along with a range of pendants made from glass beads, animal teeth and sea shells.[11] While the nature of the grave good suggests there would have been social differences at Aymyrlyg, perhaps based on gender and aspects of the life course, Mandelshtam observed that no individuals were associated with significant wealth.[12] As such, it seems probable that the people buried at Aymyrlyg were the ordinary members of society; their tombs are similar but poorer to the royal tombs of neighbouring Pazyryk in the Altai mountains.[13]

As well as evidence for the burial of complete corpses the remains of disarticulated skeletons were also occasionally encountered within the log house tombs (see Figure 2). Furthermore, the presence of cut marks on the remains of some 29 individuals is indicative that the bodies were not disarticulated as a consequence of natural taphonomic processes but rather through the deliberate actions of the living.[14] Defleshing cut-marks are generally represented by the occurrence of fine, short cut-marks or the presence of broader scraping marks over the entire bone surface. The evidence for disarticulation comprises fine cut-marks located at or near joints and are indicative of the use of a sharp tool to sever the skin, tendons and ligaments at a joint thereby enabling the division of the body into smaller segments.[15] Some three-quarters of cut-marks apparent in the human remains from Aymyrlyg were indicative of disarticulation,[16] the principal objective of which appeared to have been the detachment of the upper and lower limbs from the trunk (Figure 3). In addition, the lower legs were severed from the upper legs and the forearms were separated from the upper arms. When defleshing marks were recorded, these focused on the upper leg bones, the bones of the pelvic girdle and the shoulder blades and it is probable they were related to the removal of the heavy musculature of the thigh and the shoulder. Only adults were treated in this manner, with men (62%) displaying a notably higher proportion of cut-marks compared to women (38%). It is highly probable that the number of individuals processed in this manner is under-estimated since the skill of the processor, the size of the joint and the state of decomposition of the remains are all factors that would have an impact on whether or not cut-marks are visible in the skeleton.[17]

Artificial mummification was widely practised amongst Iron Age groups in Siberia, and the contemporary Tagar and Pazyryk cultures,[18] as well as the later Tashtyk culture of the 3rd–5th centuries AD,[19] have produced clear evidence of this practice. As such, it is not entirely surprising that evidence of body processing was present at Aymyrlyg but how do we

[11] Mandelshtam 1983: 31–32.
[12] Mandelshtam 1992: 194.
[13] See Rudenko 1970.
[14] Murphy 2000*a*; Murphy and Mallory 2000.
[15] Buikstra and Ubelaker eds 1994: 98; Ubelaker 1989: 105.
[16] Murphy 2000*a*: 280.
[17] Murphy and Khokhlov 2016: 199.
[18] Bokovenko 1995*a*: 302; Rudenko 1970.
[19] Nikolaev and Pankova 2017: 327–29.

Figure 3. Cut-marks indicative of disarticulation at the right hip of an 18–35-year-old man from Aymyrlyg (VII. 5. Sk 4) (photograph: Eileen Murphy)

explain this practice? Mandelshtam proposed that burial of partially decomposed corpses may have been due to the death of the individuals during the winter when the ground was frozen, making it difficult to gain access to the subterranean tombs,[20] but this seems a bit simplistic because the cold conditions could have naturally preserved the bodies without further intervention. We need to appreciate that the climate in modern Tuva is continental, with mean winter temperatures of -25 to -34°C and mean summer temperatures of 19 or 20°C, which can rise as high as 40°C,[21] and the situation probably would have been have been similar in the past. Rudenko was of the opinion that the burials in the kurgans at Pazyryk had occurred during particular seasons.[22] He concluded that it would have been extremely difficult to bury the dead during the winter or early spring since the ground would have been frozen to a considerable depth. In addition, a number of findings obtained from the Pazyryk kurgans support the theory that the individuals were interred during the early summer and autumn.

The archaeological, ethnographical and historical sources all indicate that the Scythian individuals buried at Aymyrlyg would have practised a semi-nomadic form of economy. The anthropologist S.I. Vainshtein suggested that the distribution of large tribal burial grounds in Tuva, including that of Aymyrlyg, indicates that cyclic migration with fixed routes and set winter camp sites would have existed amongst these steppe-mountain pastoralist groups.[23] Presumably, herds would have been pastured in the mountains during the late spring and summer and in the more low-lying land during the autumn, winter and early spring. Since Aymyrlyg is located in a river valley it is probable that people would have been living in relatively close proximity to the cemetery during the colder months, including when the ground was frozen. As such, it seems possible to reconstruct burial practices in the following way:

- normal articulated burials would have occurred in autumn immediately before the ground became frozen, or in spring as soon as the ground had sufficiently thawed;
- the corpses of individuals who had died during the winter period may have been temporarily preserved in the snow, without need of artificial processing until the spring, when they would have been buried in a relatively undecomposed and intact condition;
- the cadavers of those who died in the later spring to early autumn months in the mountain areas would have required some form of processing. It would have been both unhygienic and unpleasant for the remainder of the population if corpses had been allowed to naturally decompose in the summer heat. It would, therefore, have been extremely practical for the bodies to have been disarticulated, and sometimes defleshed, and stored safely in a cloth sack or leather bag until the group returned to the main tribal cemetery at Aymyrlyg in the early autumn.

A study of almost 300 Bronze Age (3500–1200 BC) individuals from the middle Volga-Ural region of Central Russia revealed evidence of small numbers of individuals who had been disarticulated and defleshed.[24] The authors commented that the occasional disarticulation of the dead is a recurring trait of Eurasian mobile pastoralist groups that has been largely ignored. They suggest that detailed analysis of this practices has the potential to add to the growing body of literature on the dynamics of steppe pastoralism. The necessity for body processing has the potential to provide insights concerning the seasonality of movements, the demographic groups involved as well as the distances travelled.

A mobile pastoralist economy

Pastoral nomadism has ubiquitous association with the Iron Age societies of the Eurasian steppe.[25] This form of economy largely revolves around the structured

[20] Mandelshtam 1983: 27.
[21] Gracheva 2004: 247.
[22] Rudenko 1970: 28.
[23] Vainshtein 1980: 96.
[24] Murphy and Khokhlov 2016: 209.
[25] E.g., Gryaznov 1969: 131; Koryakova and Epimakhov 2007: 203; Vainshstein 1980: 51.

migratory management of domestic herd animals[26] and is used to enable an efficient exploitation of seasonal pastures.[27] The remnants of food recovered from Scythian burials in Tuva indicate that sheep and goats would have comprised the greatest proportion of the herds, although horses, cattle and dogs would also have been present.[28] Until relatively recently there was a tendency to over-simplify the nature of the pastoralist way of life. Modern anthropological and archaeological research has demonstrated, however, that pastoral systems are highly variable and complex, operating at a community-level and being determined 'according to the opportunities and risks presented by social, political, and economic interaction among pastoralists and their neighbors'.[29] Indeed, such differences of practice among the Iron Age Eurasian 'nomads' are evident in the writings of Herodotus who tells us that, while the Scythians were dependent on cattle for food rather than agriculture, not all cultures of the Scythian world were pastoralists. The Callippidae, for example, who lived to the west of the mouth of the Borysthenes (Dnieper), and their eastern neighbours, the Alazones, both had a similar lifestyle to that of the Scythians, but also grew grain, including millet, for food and even export.[30]

Information about the nature of the mobile pastoralist economy can also be gained from the skeletons themselves and dental palaeopathology and stable isotope analysis was used to investigate the diet and economy of the Scythian population at Aymyrlyg.[31] The dental palaeopathological lesions were broadly characterised by high frequencies of slight deposits of calculus (77.2% prevalence by tooth) and low to moderate levels of caries (6.4% prevalence by tooth). The pattern of caries corresponded most closely to Turner's value for foraging or mixed foraging/agricultural populations (4.4% caries prevalence by tooth),[32] as opposed to the situation for full blown hunter-gatherers or agriculturalists which respectively lay at the lower and upper ends of the caries scale. The availability of published comparative dental palaeopathological data for prehistoric Eurasian steppe populations is very limited but studies by Lillie, Murphy and Khokhlov found that caries were almost universally absent amongst Mesolithic–late Bronze Age Eurasian populations considered to have largely practised foraging/stock-breeding economies.[33]

The precise nature of the relationship between diet and calculus formation is not fully understood and high levels have been identified in populations that consumed both diets rich in protein and high in carbohydrates.[34] When the frequencies of calculus and caries are compared, however, they can be used to assess the relative levels of proteins versus carbohydrates within a group's diet.[35] Although the frequencies of calculus were very high at Aymyrlyg, the deposits were generally slight. While the prevalences appear to broadly correlate with those obtained by Lillie for a high protein low carbohydrate diet,[36] the pattern of severity appears to be different. Medium to heavy deposits of calculus had a 'consistent presence' within the Mesolithic–Neolithic Ukrainian groups,[37] whereas calculus deposits for the Aymyrlyg people were typically slight. Although the aetiology of calculus has been shown to be extremely complex,[38] it is tempting to suggest that this difference is, at least in part, due to a higher level of carbohydrate consumption among the Iron Age populations. It can therefore be concluded that the Scythian individuals from Aymyrlyg were consuming cereals but the dental evidence would tend to suggest these were not the dominant component of the diet.

To investigate this further we undertook a carbon and nitrogen stable isotope analysis of a sample of adults from Aymyrlyg.[39] The average $\delta^{13}C$ result (-15.3 ± 1.25‰) indicated a considerable departure from a pure C3 plant-based diet (e.g., wheat and barley), which might be due to either a contribution from C4 plants (e.g. various millets), and/or animals feeding on them, or to fish from a freshwater system with elevated values. The absence of a consistent relationship between $\delta^{13}C$ and $\delta^{15}N$ in the results – such as would be expected if freshwater fish, either enriched or depleted in $\delta^{13}C$ and enriched in $\delta^{15}N$, featured strongly in the diet – and led us to surmise that the elevated $\delta^{13}C$ value was attributable to a C4 plant, rather than to freshwater fish. It was concluded that the unexpectedly high $\delta^{13}C$ values at Aymyrlyg were due to cultivated millet. This conclusion is supported by findings indicating that herbivores from the Eurasian steppes consumed predominantly C3 plants, in keeping with the variable

[26] Barfield 1993: 4; Cribb 1991: 20; Khazanov 1984: 17; Salzman 2002: 245.
[27] Crawford and Leonard 2002: 3.
[28] Mannai-Ool 1970: 91; Vainshtein 1980: 52.
[29] Frachetti 2008: 16–17; see also Crawford and Leonard 2002: 2; Koryakova and Epimakhov 2007: 204–209.
[30] Herodotus, *The Histories* 4.17: 'Head from the trading-post of the Borysthenites – which, from the perspective of those who live on the coast constitutes the mid-most point of Scythia as a whole – and the first people you will come to are the Callippidae, who are Greek Scythians, and then, beyond them, another tribe, known as the Alazonians. Their way of life, and that of the Callippidae too, is Scythian in all the essentials, except that they both sow and subsist on grain – not to mention onions, garlic, lentils and millet. Beyond the Alazonians there live Scythians who farm the land, though not with the aim of eating the crops they cultivate, but rather of selling them on. North of them live the Neurians'.
[31] Murphy *et al.* 2013.
[32] Turner 1979: table 3.
[33] Lillie 1996; Murphy and Khokhlov 2016: 206–207.
[34] Lieverse 1999: 226.
[35] Keenleyside 2008: 265.
[36] Lillie 1996.
[37] Lillie 1996: 140.
[38] See Lieverse 1999.
[39] Murphy *et al.* 2013.

but generally low prevalence of wild C4 plants in the region.[40] Secondly, elevated δ13C values are not seen in earlier Bronze Age humans in the Minusinsk Basin of southern Siberia as would be expected if wild C4 plants made an important dietary contribution in this region.[41] Wild C4 grasses may have occasionally been consumed but they would have needed to be a staple part of the long-term diet to result in the observed δ13C values obtained for the Aymyrlyg people. The remains of millet and possible querns have been recovered from some Scythian burials in Tuva and Mandelshtam was of the view that the population may have practised occasional agriculture but more probably obtained agricultural products through exchange processes with neighbouring farming tribes.[42] The findings of the stable isotope analysis, however, led us to conclude that crop-based agriculture, and specifically millet, played a much larger role in the Iron Age steppe communities of Tuva than was previously recognised and, indeed, may have formed as much as one-third of the diet. The source of the millet presumably ultimately lies in northwest China, but there remain large gaps in our knowledge concerning its transmission.[43]

The average δ15N result of 13.2 ± 0.55 was also fairly high and is possibly an indication that freshwater fish made a significant contribution to human diet at Aymyrlyg. The importance of freshwater fish in the diets of Eurasian and central Asian steppe populations is being increasingly acknowledged, largely as a result of stable isotope studies.[44] The location of the Aymyrlyg burial ground alongside a tributary of the river Yenisey makes this suggestion all the more feasible. As such, while the Aymyrlyg people may be broadly categorised as pastoral nomads, it is clear they practised a complex mobile pastoralist economy which included a significant degree of agriculture and, in all likelihood, considerable use of freshwater fish.

A mobile pastoralist way of life

In the next section we will consider the impact that a complex mobile pastoralist economy might have had on the health status of the people buried at Aymyrlyg. We have established that those who buried their dead at Aymyrlyg probably lived in the vicinity of the site during the colder seasons of the year, spending the warmer months with their herds in higher pastures. During the seasonal shifts oxen likely pulled carts filled with the group's belongings.[45] Di Cosmo cites an ethnographic example from the Selenga valley, near lake Baikal in southern Siberia, which provides insights concerning traditional methods of land tillage employed by nomadic pastoralists.[46] Farming activities occurred on strips of land near river banks. The soil was broken open using wooden ploughs and the clods of earth were worked by the naked hand, following which cereal plants were sown. The nomads then moved on to their summer pastures, returning to harvest their crops in the autumn. This model would seem to correlate with what may have happened for those buried at Aymyrlyg. It seems probable that the main form of dwelling of the Uyuk culture mobile pastoralists would have been the transportable yurt which was made from felt, leather or skins. The severe winters would have potentially necessitated more solid dwellings, however, and they may well have constructed polygonal wooden dwellings similar to those used by the present day populations in the region until relatively recently.[47]

Little is known about the impact of mobile pastoralism on past population health and the palaeopathological data derived from the Aymyrlyg people is therefore of particular significance but more work is needed to help determine whether or not this lifestyle would have been more difficult than for those who, for example, practised a more sedentary form of existence within a steppe environment. Such analysis would potentially enable an assessment to be made as to whether or not the annual seasonal movements would have had a negative impact upon health.

A substantial body of literature exists on the evidence for physiological stress in past skeletal populations.[48] This is not surprising since biological stress is a central factor in the study of the health status of past human societies. Goodman and colleagues, in their model of the factors largely responsible for physiological stress, have emphasised the key role that the environment plays – both in terms of providing resources for survival but also concomitant stressors. Depending on host resistance factors, the stressors can then cause physiological disruption or stress to the skeleton which is manifested in disruption to growth and the development of disease and can ultimately result in death. The impact of physiological stress can have serious negative consequences on a population, resulting in a decreased level of health, a reduced ability to undertake work, a suppressed reproductive capacity and general socio-cultural disruption.[49]

Murphy undertook a study that attempted to assess whether the purported Xiongnu invasion of Tuva during the late 3rd/early 2nd centuries BC had a

[40] Privat *et al.* 2005.
[41] Svyatko *et al.* 2013.
[42] Mandelshtam 1992: 193.
[43] See Svyatko *et al.* 2013.
[44] O'Connell *et al.* 2003; Privat *et al.* 2005; Shishlina *et al.* 2007.
[45] Vainshtein 1980: 72.
[46] Di Cosmo 1994: 1100.
[47] Bokovenko 1995*b*: 280.
[48] E.g., Cohen and Armelagos eds 1984; Steckel and Rose eds 2002.
[49] Goodman *et al.* 1984; Goodman 1991.

Figure 4. Anterior dislocation of the right glenohumeral joint and associated compression fracture of the humeral head in an elderly man (50+ years) from Aymyrlyg (XX. 8. Sk 2) (photograph: Eileen Murphy)

negative impact on the people who buried their dead at Aymyrlyg.[50] Both Scythian and Hunno-Sarmatian populations would have practised a similar form of mobile pastoralist economy and it was hypothesised that a deterioration in health in during the latter period could be related to societal instability at this time. A potential rise in ill health was observed with an increased prevalence of cribra orbitalia, porotic hyperostosis and dental enamel hypoplasia suggesting that, as children, members of the latter group were more susceptible to physiological stress than the Scythian group. At a basic level, all three of these lesions are considered to be non-specific indicators of ill health caused by a multitude of conditions related to factors including, malnutrition, a lack of hygiene, infectious diseases and parasitic infections.[51] Further support for the interpretation that living conditions had deteriorated as a direct result of the activities of the Xiongnu empire was apparent in the increased levels of violence-related injuries observed in the later population.

Anthropological research has demonstrated that modern steppe mobile pastoralists live in close proximity to their herds of sheep and goats,[52] undoubtedly placing them at risk from a range of pathogens. Definite evidence of tuberculosis was identified among the later Hunno-Sarmatian population at Aymyrlyg, including cases that were verified through ancient DNA analysis and were of the form spread from animals to humans (*Mycobacterium bovis*).[53] While no definitive lesions of tuberculosis were present among the Scythian group four individuals displayed lesions that were considered to have suggestive of tuberculosis,[54] and it seems reasonable to assume that these people would also have been acquiring such zoonoses from their animals. This will hopefully be tested through further ancient DNA analysis in the future.

Evidence from the skeleton can also tell us about the nature of the daily activities in which people may have engaged. Some 8% (35/430) of Scythian adults at Aymyrlyg displayed one or more fractures in their bones. When the nature of the fractures is scrutinized more closely it is evident that in ten of the affected individuals the injuries were characteristic of heavy falls. This finding may reflect the mobile pastoralist nature of their lifestyles which would have involved a considerable amount of horse riding and travelling in wagons.[55] A clear example of injury having occurred as a result of a severe fall was evident in the remains of an elderly man with a dislocated shoulder joint and a number of fractures of the appendicular skeleton. The right shoulder displayed an anterior dislocation of the humeral head which displayed a compression fracture; the man would probably have suffered from considerable pain in his shoulder (Figure 4). The most common cause of anterior dislocation of the glenohumeral joint is a fall on the outstretched hand or on the shoulder itself. He also displayed fractures in one of his left forearm bones and in one of his right lower leg bones. All of the lesions were in an advanced state of healing, and the presence of eburnation on the false joint surface of the dislocated shoulder may indicate that they had been sustained a considerable amount of time before death.[56]

[50] Murphy 2012; cf. Davydova 1996: 159.
[51] Griffin and Donlon 2009; Walker *et al.* 2009: 116.
[52] Murphy 2008.
[53] Murphy *et al.* 2009.
[54] Murphy 1998.
[55] Murphy 2003*a*: 41–44.
[56] Murphy 2003*a*: 51–53.

A very slight sex difference in the prevalence of accidental fractures was evident with men (3.5%; 8/231) affected to a greater extent than women (1.0%; 2/199) but this was not statistically different. This finding is interesting in light of the descriptions of male and female activities within Scythian society contained in the writings of Herodotus and the Pseudo-Hippocratic texts. The latter relates how Scythian females stayed in the ox-drawn wagons during the seasonal migrations, while the males rode on horseback followed by their herds.[57] In the account of the Amazons presented in the same text the differentiation between males and females is further implied since the Amazons engaged in activities such as horse riding which the Scythian females did not undertake.[58] Herodotus stated that Scythian females 'only ever do women's work! They do not go off hunting, or anywhere at all, in fact – they just lurk inside their wagons'.[59] It is possible that at least some of the heavy falls that had affected both men and women had occurred as a result of horse riding.

There is further evidence in the remains of the adult females that suggests they did not spend all of their time sitting around in wagons as the ancient writers would suggest. Of particular note is the pattern of occurrence of spondylolysis, a particular type of injury that occurs at the posterior part of the lowermost vertebrae. In modern populations it is mostly found in males and has a higher frequency among athletes, especially those involved in gymnastics, diving, weight-lifting, pole-vaulting and American football. The aetiology of spondylolysis is uncertain, with genetic or traumatic causes both considered as possible causes. It has been suggested that it may arise as a result of a fatigue fracture occurring as a consequence of repeated trauma, possibly due to bending and lifting in an upright position, although acute fracture at the pars interarticularis, after a single incident of trauma, probably accounts for a proportion of the defects.[60] At Aymyrlyg the injury had a crude prevalence of 4.0% (8/199) for women and 1.7% (4/231) for men. As such, it is clear both the Aymyrlyg men and women engaged in physically arduous tasks; the nature of the 'feminine tasks' alluded to by Herodotus certainly seem to have placed stress and strain on the bodies of at least a proportion of women.

Two sides of humanity: violence and care

In addition to accidental injuries, fractures more characteristic of interpersonal violence, including night stick fractures of the ulnae, depressed fractures of the cranium and fractured facial and nasal bones, were observed among the Scythian people at Aymyrlyg. The crude prevalence rates of such injuries were 7.3% (17/231) for men and 3.0% (6/199) for women. Fractured nasal bones were the most common of these injuries and men (4.8%; 11/231) were significantly more frequently affected than women (0.5%; 1/199) (χ^2 5.33, df 1, p 0.027).[61] A pre-teen and two teenagers also displayed depressed cranial fractures.[62] It is possible that these injuries were attained in face-to-face, fisticuffs style brawls, although rough play in sporting activities could also account for the injuries.

A large variety of weaponry, including pointed battle axes, daggers, and bows and arrows, has been recovered from burials of the Uyuk culture in Tuva, and these have been considered indicative of the important role that warfare played in society. The main objectives of warfaring practices would probably have been to capture better pastures, valuable objects and possibly slaves who could have been used as a work-force for husbandry of the tribal herds.[63] Herodotus talks at length about the warring practices of the Scythians and seems to have been particularly fascinated with their use of decapitated heads as a means of demonstrating their battle prowess.[64] More generally, the cultures

[57] Chadwick and Mann 1978: 163.
[58] Chadwick and Mann 1978: 162–63.
[59] Herodotus, *The Histories* 4.114; cf. also *The Histories* 4.121: 'the wagons in which all their women and children lived they dispatched north, with orders to keep going, and never stop. Together with the wagons they also sent on ahead their flocks and herds, all except those they needed as provisions, which they kept behind'.
[60] Roberts and Manchester 2005: 106.
[61] Murphy 2003*a*.
[62] Murphy 2008: 181.
[63] Mannai-Ool 1970: 90.
[64] Herodotus, *The Histories* 4.64–65: 'War, as practised by the Scythians, has a number of distinctive characteristics. When a Scythian records his first kill, he will gulp down the man's blood. He will also bring the heads of those he has killed in battle to the king, for a head will secure him a share of whatever booty may have been won, whereas no head means no booty. The head itself is scalped: what happens is that the skin is incised all the way around from ear to ear, and then is pinched and worked off the skull. After that, he uses the rib of an ox to scrape it free of any flesh and kneads it with his hands, until it is so soft that he effectively has a knapkin that he can fasten to the bridle of the horse he is riding, and take great pride in: the man with the largest number of these napkins is reckoned to be the bravest. There are many Scythians who wear cloaks fashioned out of scalps, which they stitch together in the manner of shepherds who make cloaks out of leather. A common practice as well is to take the corpse of an adversary, to skin the right hand, fingernails and all, and then to make it into the cover for an arrow-sheath. (Human skin, it turns out, is thick and has a tremendous sheen, more brilliant, and whiter, than almost any other kind of skin). There are also many Scythians who will flay men entire, and stretch the hides on wooden frames, which they then carry around with them on their horses. So much for the customs that govern their behavior in the field of war. Each of the skulls themselves – if it belonged to a bitter enemy, that is, rather than just to anyone – is sawn in two, with everything below the brow being discarded, and everything above it being scoured clean. If the man doing this is poor, he will simply wrap raw ox-hide around the exterior before using it; if he is wealthy, however, then as well as wrapping raw hide around it, he will also gild the interior and employ it as a drinking-cup. Skulls also derive from family feuds, since these see rivals from the same clans fighting one another to the death before the king. The victor, if he has any distinguished guests to stay, will be sure to pass these skulls around, together with an explanation: that they once belonged to his kinsmen, that these kinsmen made trouble for him and that he succeeded in vanquishing them. Such, to the Scythian, is the very mark of a hero'; see also Spindler *et al.* this volume.

Figure 5. Battle-axe injuries in the skull of a 35-50-year-old man from Aymyrlyg (B.8 Sk 1). No evidence for healing was visible and it is probable the man died as a result of these blows (photograph: Eileen Murphy)

of the Scythian world are considered to have been highly successful in warfare because of their tactic of assaulting the enemy with large groups of mounted archers. The bow-warriors were skilled horse-riders and they had even perfected the art of shooting backwards while riding at full gallop.[65] It is interesting to note that late 19th and early 20th century Tuvinians were also reported as capable of hitting an animal using a bow and arrow when on horseback at full gallop.[66]

Further evidence for the occurrence of interpersonal and intergroup violence was evident among the Scythian individuals at Aymrylyg in the form of weapon injuries which had a crude adult prevalence of 3.0% (13/430), with men (5.0%; 12/231) significantly more frequently affected than women (1.0%; 1/199) (χ^2 6.1, df 1, p 0.01).[67] Two children also displayed battle axe injuries on their crania (crude prevalence 1.2%; 2/171). Most of the injuries had been made with pointed axes (*chekans*) (12/15) (Figure 5), with sword injuries only sporadically occurring. No arrowhead injuries were identified in the Scythian group and the prevalence of injuries was relatively low. As such, it seems probable that the injuries attained by these individuals had not occurred during large-scale warfaring practices but rather as a result of raiding between groups.

It is interesting that to note that the ancient writers are silent about the pointed battle axe-pick: this ice-pick-like weapon was clearly lethal. The archaeological evidence is suggestive that it had widespread use throughout the Scythian world and one of the royal Scythians, the man buried in kurgan 2 at Pazyryk, displayed at least two pointed battle axe-pick injuries in his cranium (Figure 6).[68] In addition, horses included in high status kurgans in the Altai frequently display evidence of having been killed by at least one blow from a pointed battle axe to the top of their skull.[69] Human skulls with such injuries have also been discovered in Iron Age populations in Armenia,[70] northern China[71] and Mongolia.[72] Artistic depictions also exist of warriors with such battle axes, such as that on a 4th-century BC bronze vessel recovered from kurgan 3 of the Tchastye Kurgans, situated near the town of Voronezh in south Russia.[73]

A single Scythian case of scalping was identified in an adult male from Aymyrlyg, as well as two further cases from the later Hunno-Sarmatian population. Unfortunately, the context for the Scythian case was uncertain and only the skull was available for analysis. Numerous small sharp cut-marks were apparent which followed the circumference of the skull and were indicative that the man had been scalped around the time of death. He also displayed healed fractured

[65] Sulimirski 1970*a*: 394; see Loades, this volume.
[66] Vainshtein 1980: 170.
[67] Murphy 2003*a*.
[68] Rudenko 1970: 219.
[69] E.g., Jettmar 1951: 175; Polosmak 1994*a*: 97.
[70] Khudaverdyan 2012: 228.
[71] Murphy and Davis-Kimball 2001.
[72] Bazarsad 2003.
[73] See Schiltz 1994: 390.

Figure 6. The head of the man from Barrow 2 at Pazyryk: two axe-pick holes are evident and the scalp has been cut off from the top of the forehead to the back of the neck (photograph: Yuri Chistov)

nasal bones which indicate he had been no stranger to violence during life. The high status man with axe-pick injuries from kurgan 2 at Pazyryk also displayed evidence for scalping (see Figure 6).[74] Herodotus described the practice of scalping among the people of the Scythian world at length, telling us that the head of a vanquished enemy was carefully processed with the skin stripped from it by means of a circular cut around the ears. The skull was shaken out, the flesh was scraped from the skin using an ox rib, and the scalp was then cleaned and worked by the warrior until supple, when it was hung on the bridle of the warrior's horse as a symbol of battle prowess.[75] Herodotus' description cited earlier corresponds perfectly to the pattern of cut-marks evident in the remains of these Scythian individuals.

A further example of trauma of particular note was the discovery of a 5-6-year-old child who appears to have had their throat cut and then been decapitated. A series of tiny cut marks visible on the anterior surface of the bodies of the first and second vertebrae were characteristic of a cut throat, while chop marks on the posterior aspects of the third and fourth cervical vertebrae indicated decapitation.[76] As discussed above, Herodotus recorded that the heads of vanquished enemies were to be presented to the leader so that a warrior could get their shares of the spoils of war – 'no head, no loot'.[77] It is possible this child was an important strategic kill and that is why he or she was treated in this manner. Indeed, another Scythian juvenile was considered to have displayed a post-mortem trepanation that may have facilitated the display of his or her head by means of suspension.[78] Given the young age of the child with the cut throat, however, we also need to consider other possible explanations related to the sacred side of life. Herodotus recounted that Scythians worshipped the god Ares on a square platform mounted on a huge mound of brushwood, at the summit of which was positioned an ancient iron sword. Every year prisoners of war, horses and cattle were sacrificed to this sword which represented the god. The sacrifice of humans involved the cutting of their throats over a bowl, with the collected blood then poured over the sacred sword.[79] As such, it is possible that the child had been killed during a ritual sacrifice.

Although he evidently did not admire the Scythians – inferring they were one of the most uncivilised nations in the world – Herodotus grudgingly admitted that he did respect their success at self-preservation and went as far as to say they could never be beaten in warfare.[80] His writings have helped contribute to the view of Scythian mobile pastoralists as rather bloodthirsty warriors but it is important to stress that the levels of violence apparent in the Aymyrlyg people were not abnormally high. Furthermore, the bioarchaeological analysis of the Aymyrlyg population also revealed evidence for a softer side to these people; they supported and probably cared for members of their society with severe longstanding physical impairments.

[74] Murphy *et al.* 2002.
[75] Herodotus, *The Histories* 4.64.
[76] Murphy 2008: 182.
[77] Herodotus, *The Histories* 4.64, quoted above.
[78] Murphy 2003*b*: 213–15.
[79] Herodotus, *The Histories* 4.62: 'They also sacrifice one in every one hundred prisoners taken in battle – although not as they sacrifice livestock. Rather, their method is to pour wine over each man's head and to cut his throat over a bowl, then to carry the bowls up onto the pile of brushwood where the blood is poured out over the sword. Meanwhile, as the bowls are being carried up to the summit of the shrine, something else is being performed down by its side. From hand to shoulder, the right arms of all the men who have had their throats cut are hacked off and tossed up into the air, whereupon all the other victims are sacrificed as well. Everyone then departs, with the arms left lying wherever they happened to fall and the corpses in a separate pile'.
[80] Herodotus, *The Histories* 4.134.

Figure 7. Notably enlarged left eye socket in an 18-35-year-old woman from Aymyrlyg (XXIII. 10. Sk 2) suggestive of the presence of a soft-tissue tumour possibly associated with the condition neurofibromatosis (photograph: Eileen Murphy)

As discussed above, the Scythian people buried at Aymyrlyg would have lived within a mobile pastoralist society that revolved around maintaining herds of sheep and goats and involved seasonal migrations, all within a potentially quite arid steppe environment. The evidence of physiological stress and tell-tale signs of hard work in the skeletons are suggestive of an arduous physical existence. A particularly notable feature of the population was the presence of individuals with serious congenital conditions that would have impacted on their ability to engage in aspects of this undoubtedly physically demanding lifestyle.[81]

Two young women displayed developmental dysplasia and congenital dislocation of one hip in which the acetabulum had a triangular morphology and did not articulate with the femoral head. All bones of the affected leg were markedly gracile and had 'wasted away' through lack of use. The women would have relied upon some form of crutches for walking. Although they would have been able to engage in a wide range of activities essential for daily life they may have required assistance with some basic activities, such as getting in and out of wagons during the seasonal migrations and carrying heavy items, such as containers of water.

Three Scythian individuals displayed probable polytropic defects; congenital conditions that would have caused multiple defects to the body. A young woman displayed a grossly enlarged orbit and a number of other cranial malformations and is considered to have suffered from neurofibromatosis (Figure 7). This is the term used to represent a wide range of abnormalities resulting from neuroectodermal dystrophy; it is a congenital condition with an autosomal dominant inheritance. The woman undoubtedly had an abnormal facial appearance with a grossly enlarged and probably protruding eyeball.[82] She would probably have had reduced vision or even complete blindness in the affected eye. Unfortunately, only the skull was preserved so it is impossible to ascertain the full extent of the lesions but clinical studies indicate that other physical characteristics of neurofibromatosis include the occurrence of café au lait spots, skin tumours, scoliosis of the spine, joint problems, as well as a large range of other abnormalities involving the central and peripheral nervous system.[83]

A young man displayed markedly coarse facial features with abnormally large brow-ridges, widely spaced eyes and an asymmetrical face and chin, features that are compatible with the congenital condition frontometaphyseal dysplasia. Again, only the skull was preserved and it is impossible to determine the full extent of skeletal involvement. Clinical studies have indicated, however, that individuals with the condition also may be affected by deafness and poor vision, along with a short torso with long extremities, knock-knees, scoliosis, angulation of the wrists in an outward direction, elongated fingers and relatively immobile joints.[84] An 8-9-year-old child displayed unilateral hypoplasia of the left side of the skull that was considered characteristic of the condition Goldenhar Syndrome. Yet again, only the skull of the individual was

[81] Murphy 2000*b*.

[82] Murphy *et al.* 1998.
[83] Brazier 1994: 247; Hoskins and Kass 1969: 386.
[84] McAlister and Herman 1995: 4207.

available for analysis so it was not possible to determine if other defects were present within the skeleton. Signs and symptoms identified in modern people with the condition include abnormalities of the external ear and deafness, eye defects possibly including an abnormally small or non-existent eye, mental retardation, and vertebral anomalies.[85]

The individual with possible Goldenhar Syndrome died as a child but the health status of the two adults would probably have worsened as they aged since both neurofibromatosis and frontometaphyseal dysplasia are progressive conditions. While these individuals would undoubtedly have played active roles in their society they very probably relied on others for support at times during their lives, particularly in the years before they died. The fact they were interred in the log house tomb complex at Aymyrlyg would tend to suggest they were full members of the community who used this burial ground.

Herodotus includes tales in his writings about people with unusual appearances that have generally been considered nothing more than the stuff of fables and fanciful accounts that detract from the more factual aspects of his *Histories*. It is possible we should not be quite so dismissive of these 'stories' and perhaps palaeopathology can go some way towards helping to explain them. The origin of such tales may lie in the occurrence of individuals with developmental defects. When we consider the nature of the congenital defects at Aymyrlyg, Herodotus' 'one-eyed' Arimaspians and the 'goat-footed' race could well have been his interpretation, or the hearsay of others, about such people.[86]

Conclusions

The people buried at Aymyrlyg have provided a wealth of information about the Scythian mobile pastoralists of southern Siberia. There is still much more to be gained from the analysis of the burial ground and scope for further research that greater integrates the archaeological and anthropological findings. Going forward it is hoped to undertake further research to refine the chronology of the site that will enable more to be learned about the social structure of the mobile pastoralists buried therein. Ancient DNA analysis offers huge potential to understand the genetics of the people buried at Aymyrlyg as well as enabling more nuanced studies to be undertaken of the people buried within individual communal tombs. Advances in stable isotope analysis could further increase understanding of childhood health and population mobility. Our understanding of the Aymyrlyg population is not yet complete and there are many more stories to be told about these fascinating people of the Scythian world.

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[85] Gorlin *et al.* 1990: 646; Sargent and Ousterhout 1983: 1040.
[86] Murphy 2004.

Pazyryk horse masks of Gorny Altai

Maria Ochir–Goryaeva[1]

Abstract

This paper is devoted to the study of horse dress with masks of mythological beasts and birds. Due to the permanent frost the horse dress with masks made from organic materials were preserved in the burial mounds of the Pazyryk culture in Gorny Altai. These masks may be divided into two types and their functions discussed here.

Keywords: Kurgans; 'Animal Style'; horse-dress masks; Eurasian steppe; Pazyryk culture

Introduction

The Pazyryk culture is famous for its archaeological finds, including mummified remains of the buried and of the horses accompanying them, as well as numerous artifacts of wood, leather, wool and other organic materials, recovered in the Pazyryk kurgans in a uniquely preserved state. The sites are located on either side of the Katunskii-Chuiskii[2] mountain ridge which divides the sites between the two areas: the western and eastern ones (Figure 1). Notably, in the rich royal burials the horses usually had magnificently elaborated ceremonial harness, and in a number of cases the headdress recovered on the horse remains resemble masks. The headdress masks were of two types: those ornamented with horns of wild animals, such as a mountain sheep or a deer, and those ornamented on the top with small heads of wild or fantastic animals and birds (Figure 2). These horse dress masks are now discussed in more detail, beginning with those from sites in the western part of the Pazyryk cultural area and then move those from the east, which not only reflects the spatial distribution but also their chronological order.

Type 1: Horse dress masks with horns of wild animals: a mountain sheep or a deer

The earliest finds of this type were recovered in the western part of the Pazyryk culture. Of particular note is the second Bashadar kurgan which contained the remains of a 60–65 year old male and a 40 year female, accompanied by 14 horses.[3] One of these horses had the harness which was in an exceptionally well-preserved state: horse 2 (set 4) was found at the northeast wall of the chamber, which makes it the easternmost and physically the closest to its buried master. This horse was harnessed with equipment made of solid bronze, and the bronze cheekpieces and headband plaques were covered with gold foil. The bridle belts were entirely covered with cast bronze ornaments in the form of an asymmetric rosette. The chest strap was decorated with the same kind of plaques as the bridle, totalling 33 fittings in all. The saddle cushions of thin red felt were decorated with vulture figures carved from wood and covered with gold foil; the largest pair of these were attached on the front and another two, of a smaller size, at the rear. The saddle top was composed of 56 squares arranged in a chessboard-like pattern and had been cut from the pelt of a black colt alternating with red felt squares decorated with small wooden crosses covered with gold foil. There was also a well preserved large bronze buckle girth with a button-ledge. The finds recovered at the horse's head included a whip handle decorated with three carved wooden wolf heads covered with gold foil (each smaller in size than the preceding one); the whip itself was decorated with a gold helix-like ribbon and a gold ribbon woven around its tail.

This exceptionally luxurious assemblage of horsegear indicates that this was no ordinary horse. Notably, as the excavation leader remarked, the horse's leather headdress was decorated with the horns resembling that of a mountain ram. These horns measured 46 cm in length and were made of several pieces of wood glued together; on the inside they were covered with solid plates of silver, whereas on the outside they were decorated with semi-circular projections imitating the annual growth rings of an adult ram and covered with several layers of gold foil. The horns had two holes at their base for attaching them to the horse headdress.

A horse headdress of the same type was found in the first kurgan at Tuekta, situated in the same western area.

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[2] Transliteration from Cyrillic follows the Library of Congress system without diacritics, if there is no conventional way of spelling the item in English.

[3] Rudenko 1960.

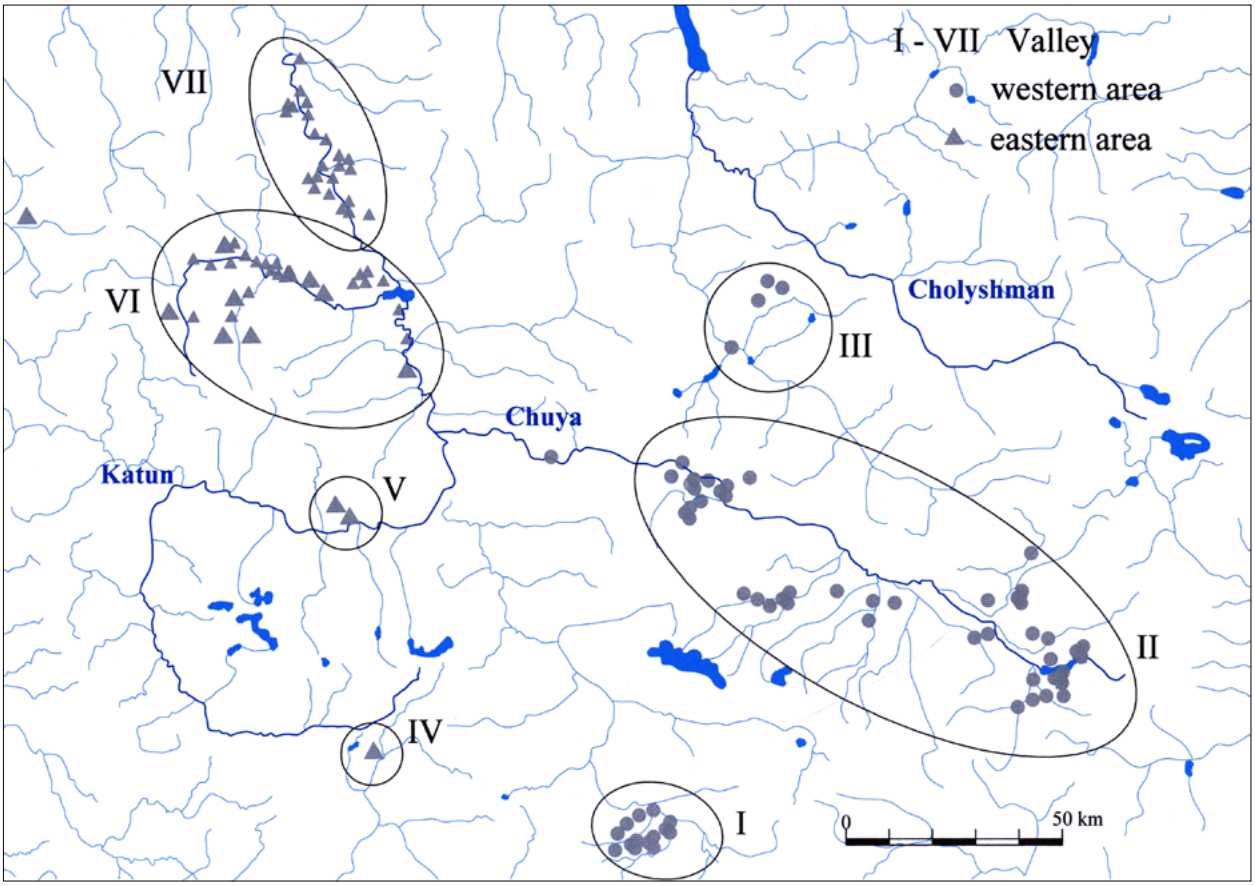

Figure 1. Map giving the relative location of sites of the Pazyryk culture with the western and eastern groups indicated by IV–VII and I–III respectively

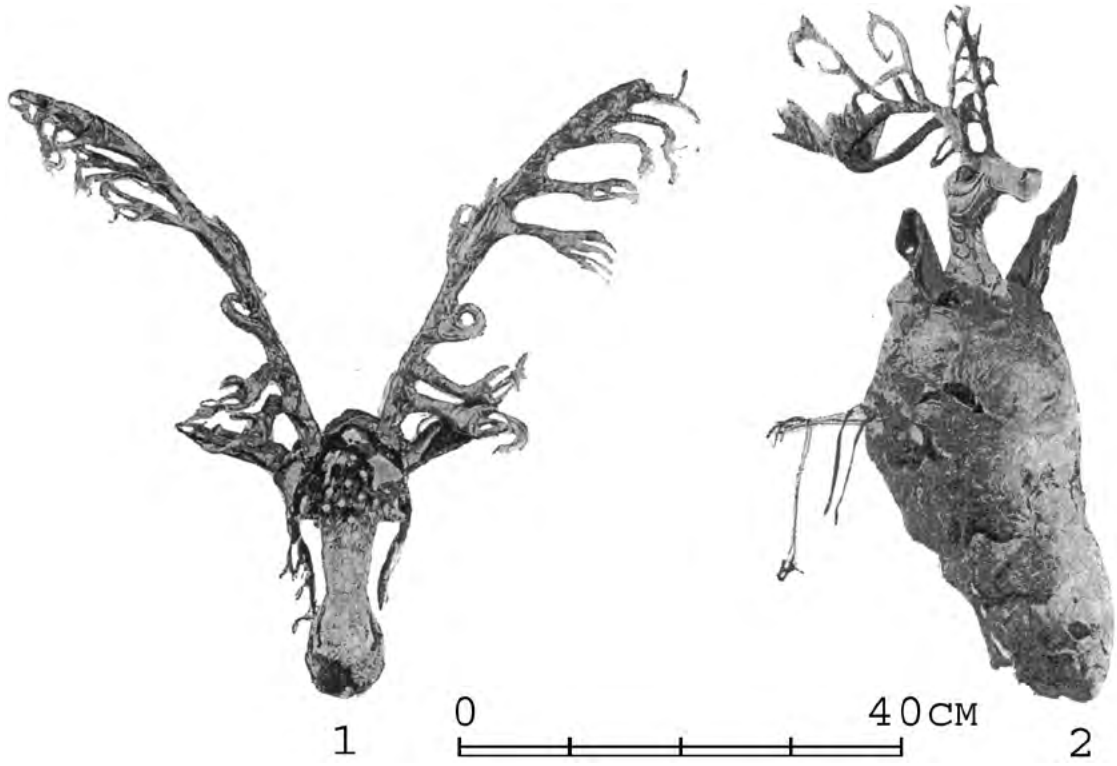

Figure 2. The fifth Pazyryk barrow. Horse mask: 1, type 1, horse dress with horns; 2, type 2, horse dress with the top shaped in the form of the heads of wild and fantastic animals (after Rudenko 1953: table 71, 109)

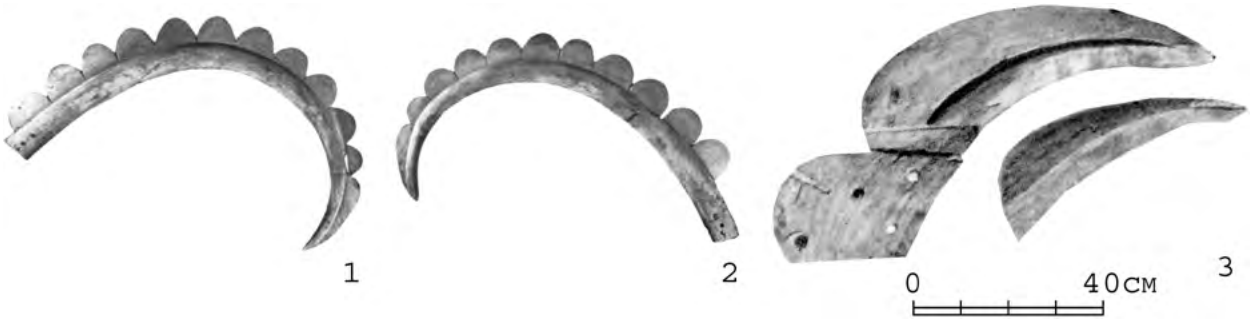

Figure 3. First Tuekta kurgan horse mask 1: 1–2, wooden horns; 3, fragments of wooden horns (after Rudenko 1960: tables 68–69)

In this case, the burial of a 40–48 year male individual was accompanied by eight horses.[4] Their harness was originally placed between the inner and outer walls of the log cabin on its northern side. When the grave was looted in antiquity, the robbers managed to carry this equipment into the chamber and, after stripping it of the golden decoration, left the remains behind. As a result everything was in great disorder and the wooden horns were indeed recovered in the robbers' tunnel. In his description of the finds, the excavator does not indicate whether all the horns were found in the tunnel but S.I. Rudenko noted that there were at least eight pairs of them which corresponds with the number of horses in the burial, although the horse equipment sets recovered in the kurgan were significantly more. The latter included 28 round plates and 73 saddle fittings, belonging to no less than 18 saddles. No detailed description, either of the horns or their sizes, was given by Rudenko but one can see in his photographs that they were mostly in fragments (Figure 3).

These horns are in two variants: the first have solid tubercles, whereas the second are hollow and carved on the inside. Two pairs of the second version had additional fittings: in one case, the bumps were decorated with a curved horn made of deer skin with six semi-circular spikes and a vertical ear, while the tubercles of the second pair had figures with leonine profiles. There were 10 figures of lions on one horn and two fragmented figures on the other. Of the leather horse headdresses found in the first Tuekta kurgan there were only the forehead parts of the two; these had leather sleeves designed for wooden horns and the two sleeves carved of antler are assumed to have fitted in the ends of the wooden horns.

In kurgan 11 of the cemetery at Berel', the burials of a young male individual and an old woman were accompanied by 13 horses, three of which wore headdress masks with horns of mountain sheep.[5] The corpses of these horses formed two layers, with the lowest composed of the remains of seven stallions. One of these, placed in the first easternmost row, had a headdress decorated with the horns of a mountain goat and its mane was placed inside a case (Figure 4). The upper layer consisted of the remains of another six stallions, two of which were equipped with headdress masks decorated with mountain goat horns; they were the middle one of three placed in the first easternmost row and another middle horse in the second row. These wooden horns were of two types. The first was exactly the same as those from the second Bashadar kurgan and decorated a horse from the lower layer and a horse from the first row of the upper layer. Another horse, placed in the second row of the upper layer, had horns of the same size as these two horses, but this time the horns were smooth and lacked the semi-circular tubercles.

The kurgans in the western part of the Pazyryk cultural area contained horse headdress masks decorated exclusively with the horns of an *argali* (mountain sheep). These are the finds recovered in the earliest mounds (the first Bashadar and second Tuekta kurgans), but also those of kurgan 11 of the chronologically later Berel' cemetery, which dates to the same period as the second Pazyryk kurgan.

We now turn to the eastern area where the first Pazyryk kurgan consisted of a burial with two individuals accompanied by ten horses. Thelatter were arranged in two rows of four, with the remaining two placed along the western wall and their heads directed to the north.[6] Two of the horses wore headdress masks, one decorated with lifesize antlers (Type 1), and the other with a finial resembling the head of a horned and winged tiger (Type 2). The horse recovered with a headdress mask made of felt and deer antlers had the best exterior and it was placed in the first row. Its horns were made of leather, and its tail and mane were encased. There is no need to focus on the headdress of this horse as it has been the subject of a recent study.[7] According to the radiocarbon evidence, kurgan 1 is the earliest of the Pazyryk kurgans and it seems no mere accident that both types of horse dress masks were among its finds.

[4] Rudenko 1960.
[5] Samashev, Bazarbaev and Zhumabekova 2002.
[6] Rudenko 1953.
[7] Barkova 1999.

Figure 4. Berel' kurgan 11: reconstruction of the horse mask type 1 (after Samashev 2007: fig. 4)

In all the subsequent, chronologically later, kurgans only masks of type 2 were recovered.

Type 2: Horse headdress masks with finials representing the heads of wild or fantastic animals and birds

Type 2 headdress masks have only been found in the eastern part of the Pazyryk cultural area, specifically in the first, second, third and fifth kurgans at Pazyryk. These masks are described separately below.

First to note is a felt headdress mask with the head of a horned and winged tiger for a finial, found in the first Pazyryk kurgan. This belonged to a horse of the second row, which stood out by its elaborate decoration from the others in this row (Figure 5). In addition to a saddle and bridle, this horse had a mask and its mane and tail were encased. Its equipment was therefore similar to that of the first row horse wearing the mask with antlers. Also identical were the leather parts of the masks, both in form and their flattened tiger shapes on their noses. However, in the first case the tiger figure was cut from blue fur, while in the second it was made of leather. The mask top is a figure of a horned and winged tiger.

This mask was designed to leave the tip of the horse muzzle open while covering its upper and side parts in the manner of a Budenovka hat. There was a felt sleeve between the horse's ears, with its felt uppermost part shaped quite realistically as a mountain goat attached to it. The head of the goat was also decorated with a bird figure made of felt, identified as a rooster by S.I. Rudenko.[8]

Another leather headdress mask resembling a wooden deer head with branches of leather antlers for a finial was found in the fifth Pazyryk kurgan. The horse wearing this mask had its mane encased in a red leather case. The mask was made of thick leather and lined with thin leather on the outside, completely covered the muzzle of the horse and was fastened with straps but had holes for the eyes, nostrils and mouth. Its top was made as a realistic figure of a deer with a branched leather horn crown carved from wood: 'The base part of the deer head was broken, the lower part of the rim was lost, and the breaks were secured with a solid belt bunch'.[9]

Finally, the finds from the third Pazyryk barrow included two wooden heads of fantastic birds which may have served as the decorative elements of the uppermost part of the horse headdress masks.

Discussion and conclusion

It should be noted that in the second Bashadar kurgan, the eleventh Berel' kurgan and the first Pazyryk kurgan horses wearing horned or finialed headdress masks were placed in each row of animals and at the head of a group of horses. This supports the idea that they were considered to be 'leaders' at the head of ceremonial processions. The traces of wear and repair on the mask with a finial found in the fifth Pazyryk kurgan may indicate that the masks had in fact been used before it was put into the grave and their use in the funerary ceremony was simply their final use.

The horse headdress masks were made of different materials and were richly decorated. Their superior artistic craftsmanship make them classic examples of the Scythian-Siberian 'Animal Style'. This presentation of horse headdress masks decorated with horns shows that in both eastern and western parts of the Pazyryk cultural area, the horses were disguised as ungulates: in the west they were designed to resemble mountain

[8] Rudenko 1953: 223.
[9] Rudenko 1953: 226.

Figure 5. The first Pazyryk mound: reconstruction of the horse mask type 2 (after Soloviov 2003: fig. 22)

sheep and in the east they were to represent deer. This interesting feature may have been an indication of clan differences but any further significance is impossible to determine.

It is appropriate at this point to refer to the research which has indicated that pagan deities often were animals exclusively representative of wildlife. As early as 1969, when publishing his data concerning the Great Berel' kurgan, S.S. Sorokin observed that it was not worth arguing about the specific kind of deer depicted on the horsemask from the first Pazyryk kurgan or on examples of 'Animal Style' as it was not a specific species but a mythical impersonation of the wild ungulate and its crown was considered the feature of greatest importance.[10] This hypothesis was supported by A.V. Grach, and both scholars referred to linguistic evidence, arguing that the Turkic nations had a special term '*bura*', which in ancient times used to denote ungulates and horned animals and was later transferred to designate domestic animals as well.[11] These data were cited in L.L. Barkova's special publication on the horned horse headdress from the first Pazyryk kurgan.[12] Additionally, one should mention a most detailed and comprehensive study made by D.V. Cheremisin who discussed the semantics of horned horses with masks from the Pazyryk kurgans. He examined in detail the historical aspect of the subject, citing Turko-Mongolian ethnographic evidence to arrive at a more elaborate interpretation and arguing that the horses disguised as wild ungulates may be seen as a combination of the mythical image of a wild ungulate with a domestic animal, thus indicating the sacred realm where the natural and human worlds combine.[13]

These horses therefore appear to have served as a means of creating moving representations of mythical animals. In some cases, these were lifesize and the whole body of a horse was disguised for the purpose: its tail and mane put in special cases and its head concealed within a headdress mask with the horns of a deer or mountain sheep. In other cases, only its head was disguised to be used as a standard to elevate small heads of mythical animals, such as horned tigers, birds and deer. The transition from recreating the full image of a mythical animal to the use of figure heads may be interpreted as an evolution from natural models to partial abstraction but it is also possible to interpret the images as reflecting the hierarchical relations between mythical animals: the most important were lifesize while those of lower rank were represented simply by their uppermost parts. In any case, the horses were disguised in accordance with mythological ideas that this ancient population had, perhaps of cosmological or an ethnogenetic nature, i.e. dealing with the origin of the world or the miraculous origin of the tribe. Of note in this regard is the fact that the masks had additional images, such as that of a tiger sprawling across the nasal part of the mask, indicating additional layers of meaning.

It should also be observed that the horses buried with headdress masks had an important mission in the ceremonial processions: that of representing mythical animals. They were not treated as deities but, in performing this mission, they were seen as mediators between the worlds of humans and their deities. The fact that the horses were disguised as mythical animals shows that as part of ceremonial processions they served as live models and standards carrying mythical images of wild and fantastic animals and birds.

Within this context the Pazyryk bridle sets are significant as they may be divided into functional and ceremonial groups: the former were for practical everyday life, whereas the latter chiefly served for

[10] Sorokin 1969: 227–32.
[11] Grach 1980: 90–91.
[12] Barkova 1999: 97–101.
[13] Cheremisin 2005.

decorative purposes when horses participated in ceremonies, including funerals. The utilitarian bridle sets were plain, lacked wooden or bronze decoration and were made in a simple functional manner. Conversely, the ceremonial ones showed elaborate craftsmanship and were richly decorated, for example with skilfully carved wooden elements covered with gold foil. The ceremonial processions which accompanied the funerals of the Pazyryk nobility included horses placed in graves with their richly decorated bridle sets. In contrast, the commoners' funerals were of a much more modest character but also accompanied by horses wearing their regular daily harness, including metal bits, horn girth buckles and belts. The number of buried horses is a marker of the Pazyryk 'royal' graves and they were most numerous in the funeral constructions of the deceased of high social rank. Importantly, magnificently decorated ceremonial bridle sets placed in burials as grave goods were another indication of their masters' social status.

One can only speculate about the ceremonial processions or other activities involving ceremonial horses wearing richly decorated harnesses. However, there is much ethnographic data and of great variety, ranging from St. George's annual horse processions in modern Bavaria to a ceremony of the first taste of *kumis* and the sanctification of horses during the Kalmyk *Urs sar* holiday, to indicate that they were part of a very widespread and long tradition of dressing horses for ritual purposes.

Mummies and mannequins from the Oglakhty cemetery in southern Siberia

Svetlana V. Pankova[1]

Abstract

The burials in the 3rd–4th century Oglakhty cemetery in Khakassia belong to a culture known as Tashtyk which is local to the Yenisei valley of the Minusinsk Basin region of southern Siberia. They are exceptional because of their well-preserved artefacts of organic materials and for their unusual funerary practices. Examples of inhumation and cremation were found side-by-side in the graves, and cremations were placed in leather human-like mannequins dressed in clothes. This is the first time that cremation appeared in this region together with other new cultural features which suggest that part of the population had arrived from elsewhere. Grave 4 at Oglakhty included well-preserved buried bodies (mummies) and mannequins, both dressed in fur clothes and with distinctive hairstyles and facial decoration. Comparison of the details of the costumes and burial paraphernalia of the mummies and mannequins was undertaken in order to identify distinctive features of each type of burial which are considered as representative of different traditions. Surprisingly it has not revealed substantial differences between them, which may be explained by a significant period when adherents of different traditions lived together in the same community. Close parallels to the Oglakhty materials from sites in the Tarim river Basin, particularly cemeteries at Niya, Yingpan, Sampula and Loulan, may indicate the places of origin of these presumed immigrants.

Keywords: Tashtyk; Minusinsk Basin; Tarim Basin; cremation; inhumation; funerary rites; masks; cloth; footwear; hairstyle

Introduction

Instances where interments within a single tomb have been carried out using fundamentally different rituals are rare and raise questions over the reasons behind the different practices. However, such burials were characteristic of the Tashtyk culture in the Minusinsk Basin, especially in its early stage dating approximately from the 1st to 4th centuries, and where burials carried out by the rites of cremation and inhumation were found side by side in wooden chambers placed at the bottom of earthen shafts.

It is indicative that cremation as a burial ritual appeared in Southern Siberia in this particular period. Along with other new features, including a different set of items with a minimal number of metal objects and new shapes of pottery, this may be evidence for the arrival of a new element of the population in the Minusinsk Basin. The materials in the cremations do not allow a detailed anthropological description of the presumed immigrants but research does indicate that all the identifiable cremations belonged to men while most of the inhumations belonged to women.[2] Early Tashtyk burials in log-built chambers are thought to represent family tombs and include between two and five individuals, which implies that there were people with different burial traditions within a single family and that Minusinsk society at that time was culturally and probably ethnically heterogeneous.

The best-known early Tashtyk monument is the Oglakhty cemetery where individual burials contained well-preserved artefacts of organic materials of leather, fur, wood and fabrics. The finds from Grave 4, excavated by Leonid Kyzlasov in 1969, are particularly interesting as the buried bodies had been preserved virtually exactly as they had been buried: the bodies represented by inhumations were in the form of dry mummies with trepanned skulls whereas the cremated remains were sewn into large leather mannequins, a kind of funerary dummy imitating the appearance of a dead person. Both mummies and mannequins at Oglakhty were dressed in fur and have distinctive hairstyles and facial decoration, evidently reflecting both the appearance of the inhabitants of the Minusinsk Basin during their lifetime and their funerary traditions. A comparison of details of the costume and funerary paraphernalia of the mummies and mannequins may give an impression of the characteristics of these groups who were buried in different ways and originally, it would seem, representing different cultural traditions.

However, if the practice of bi-ritual burials was the result of immigration, where did these new people come from? It would appear that to resolve this question it is necessary to identify these people through external analogies of their cultural attributes. However, there is a great challenge here as the main categories of finds in the Oglakhty graves – clothing of

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[2] Vadetskaya 1986*a*: 37–39; 1999: 47–49.

Figure 1. Map showing the location of the Oglakhty cemetery in the Minusinsk Basin, Altai-Sayan plateau, and other sites providing comparisons to the Oglakhty finds

fur and fabric and wooden items – have not survived in graves of the previous Scythian and immediate post-Scythian periods and it is therefore difficult to assess the extent to which they are traditional or innovative. Nevertheless, it is worth noting a number of analogies which may relate to the problem of the origin of the incoming group.

Early Tashtyk graves and Oglakhty Grave 4

The Minusinsk Basin is a small mountain-steppe region in the northern part of the Altai-Sayan plateau (Figure 1) and has favourable natural conditions and climate, so the population there was traditionally engaged in mixed farming including animal breeding and floodplain farming, as well as fishing, although settlements of the Tashtyk period have barely been explored.[3] It is difficult to judge the stratification of society and the personal wealth of those buried in the early Tashtyk period as the dimensions of burials in the cemeteries are quite standardised and the accompanying grave-goods are limited. Many unrobbed burials look virtually empty when excavated yet their dimensions and comparison with Grave 4 at Oglakhty, where organic remains were very well preserved, indicate that they might originally contained items made of organic materials. At some sites, small fragments of jewellery, gold and silver lining, glass beads and the remains of lacquered objects and silk fabrics have been found but many of these burials had been looted in antiquity.[4] According to a number of indications these cemeteries are considered to be the earliest.[5]

Almost 300 early Tashtyk burials have now been explored but owing to their better preservation several isolated tombs in the Oglakhty cemetery enable a more detailed assessment of the funerary rituals and even the clothing worn by the dead. The Oglakhty cemetery is 50 km north of the city of Abakan, in a small elevated valley above the left bank of the Yenisei river (Figure 1). It consists of three discrete plots and includes, by a preliminary calculation, about 200 burials (Figure 2). According to the existing outline of the cultures of the Minusinsk Basin the cemetery relates to the early period of Tashtyk culture and dates to the 3rd–4th centuries.[6] The site was discovered by chance in 1902 and was first explored in 1903 by Alexander Adrianov, who excavated 17 graves, three of which contained surviving items of organic materials, including fur clothing, wooden vessels, parts of mummies and mannequins.[7] An expedition from Moscow State

[3] Vadetskaya 1986*b*: 3–7; Savinov 2009: 3.

[4] Vadetskaya 1999: 32–38, 65–70, 271–76; Gotlib 2007.

[5] Vadetskaya 1999: 66–71.

[6] Lubo-Lesnichenko 1994: 91, 194; Pankova *et al.* 2010.

[7] Adrianov 1903*a*; 1903*b*; Sosnovsky 1933; Tallgren 1937; Kyzlasov 1960: 68: fig. 24.6, 106: fig. 34; Vadetskaya 1999: 230–34, table 49–52, fig. 29.2.

Figure 2. View of the Oglakhty cemetery with its three main plots
(photograph: author, 2018)

University led by Leonid Kyzlasov from 1969–1973 explored five more burials, including Grave 4, and the materials from this exceptional grave were transferred to the State Hermitage Museum. Their excellent state of preservation was due to the particularly dry microclimate: the powerful framework of two or three layers had been hermetically insulated from the earth by sheets of birch bark and the earth backfill firmly compacted by trampling. Another factor was the propitious position of the grave on a slope, so that melted snow and rainwater did not pool around the burial.[8]

Grave 4 contained the remains of four adults and a child, and these individuals had been interred according to two completely different rituals (Figure 3). Two of the adults – a man and a woman – had been buried as inhumations with trepanned skulls and painted plaster masks applied to their faces.[9] A child of six or seven years had evidently also been buried in a similar way; his/her skull had been destroyed by a pottery vessel being placed on top of it and fragments of a child's mask with traces of red paint lay alongside.[10] The bodies of the other two adults, apparently both men, had been cremated and the remaining bones enclosed inside the chests of anthropomorphic leather dummies (Figure 4). These mannequins or so-called 'dolls' are the only surviving examples of burials of this type. In Leonid Kyzlasov's opinion, the mummies and mannequins reflected two different traditions of recreating the appearance of the deceased which existed simultaneously in Tashtyk culture: mummification and imitation:

> 'Imitation combines features of local and incoming rituals, as it involves cremation, preserving an external similarity to inhumation. It is evident that in their funerals people were attempting to create the illusion of a single ritual of inhumation, which was prevalent in the local population at that time, though some of the new settlers preferred their traditional ritual of cremation'.[11]

Researchers are not unanimous as to whether or not the group burials in these tombs relate to the same time. Leonid Kyzlasov thought that Grave 4 may have been opened in antiquity for the burial of other bodies. According to his field observations, the mannequin was initially buried by the north wall of the chamber and the body of the man by the south wall, with the child placed on their legs. Later the body of the woman was placed in the tomb on top of the mannequin, which had to be moved towards the north wall, and finally the second mannequin was interred on a birch trough. Most of the wooden vessels had been placed in the tomb at the time of the second burial.[12] Evidence of the different

[8] Kyzlasov and Pankova 2004: 61; Pankova *et al.* 2010.
[9] Simpson and Pankova eds 2017: 344–45, cats 260–61.
[10] Kyzlasov and Pankova 2004: 62.
[11] Kyzlasov and Pankova 2004: 63.
[12] Kyzlasov and Pankova 2004: 62–63.

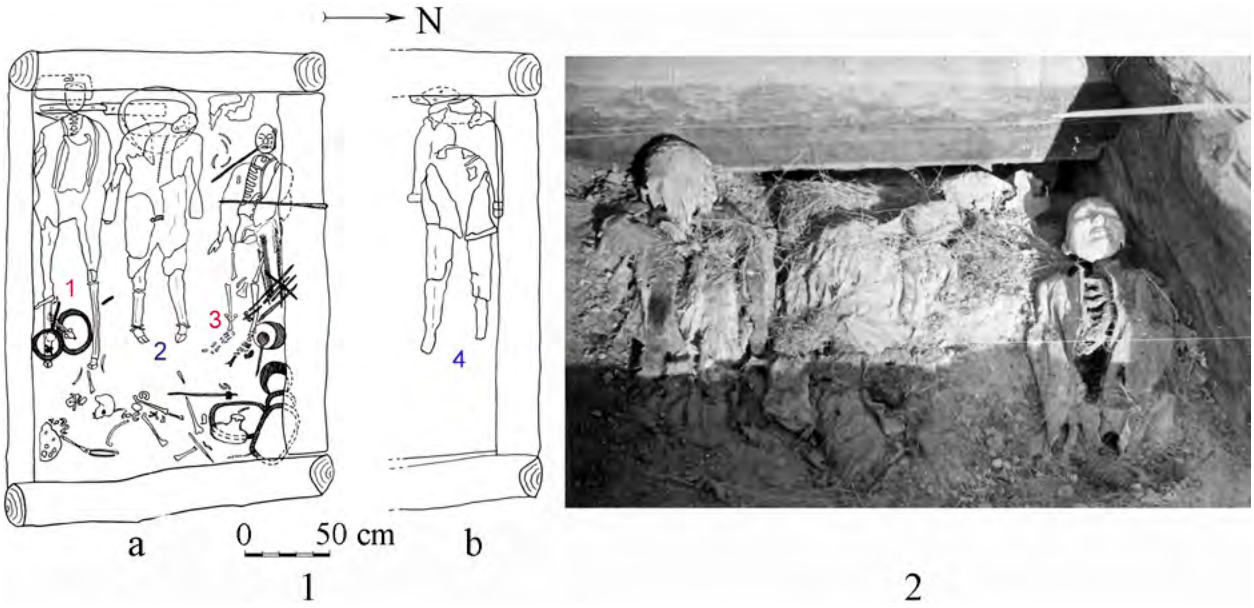

Figure 3. Oglakhty cemetery, Grave 4: 1, drawing based on a sketch by L.R. Kyzlasov in 1969 (A: upper level of the grave; B: lower level. 1, 3: mummies (1: male, 3: female); 2, 4: mannequins (2: mannequin 1, 4: mannequin 2); 2, photograph from L. R. Kyzlasov's archive

Figure 4. Mannequin 1: leather, grass, fur, fabric, cremated bones (?), L 161 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/78)

times of the burials may be the laying of beams on top of the framework by calculated incisions as they may have been designed to facilitate dismantling in order to accommodate fresh interments.[13] Wooden and pottery vessels containing whisks and meat were placed in a group in the northeast corner of the tomb. Models of bridles with wooden cheekpieces and pivoted iron bits were placed on the legs of all the deceased.

Inhumations: 'mummies'

The body of the man from Grave 4 is a dessicated mummy – the stomach of which have been partly destroyed by rodents – while the body of the woman is a skeleton with preserved sinews. These are the best-preserved remains of people from early Tashtyk burials. They have plaster masks on their faces but their heads were separated from the bodies to prevent the destruction of masks during their transportation from Khakassia in 1969. The skulls of both adults had been trepanned: in the man the aperture in the left temple is covered by the mask while the woman has a large rough hole in the back of her head. The trepanning of the skull, usual for such burials, may have been part of a mummification process, which is why these Tashtyk inhumations are called mummies. Some post-mortem operations with the bodies from Grave 4 cannot be traced any more but new computer tomography of the man's head identified a careful stitch running from the left eye to the temple and the ear (Figure 5). It may have been either the consequence of an injury or operation during the man's life or evidence of additional work on his head after death. At the same time, this may have been a way of improving the face of the man who had been mortally wounded.

On the faces of both of the deceased individuals are thin plaster masks which were brightly painted in red and black using iron oxide and charcoal pigments respectively (Figures 6.1, 30.1). Masks like these are usually very fragmentary and the painting lost and it is virtually impossible to restore them, hence the

[13] The idea of the purpose of these marks was that of Andrey Romanov, a conservator in the State Hermitage Scientific Laboratory for the Restoration of Furniture.

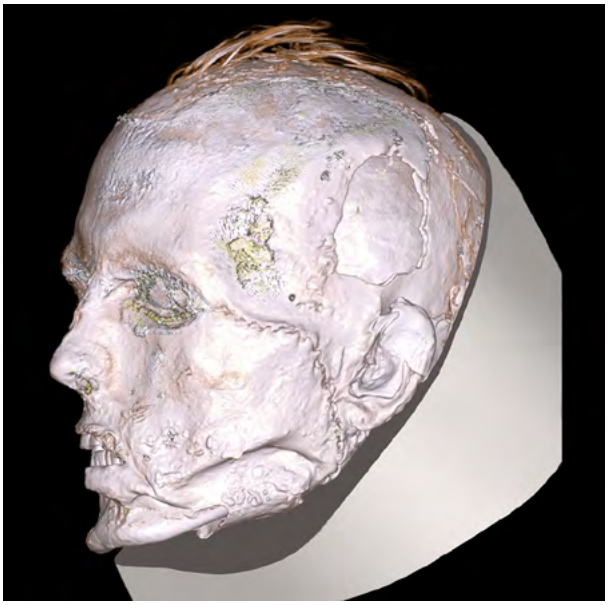

Figure 5. Man's face under the mask and a seam. Digital illustration based on computer tomography (photograph adapted for publication by Paul Goodhead)

Figure 6. Gypsum mask: 1, *in situ* on the man's head with a piece of silk on his mouth, H 20 cm. (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/2); 2, inner side of the mask: imprints of fabric around the man's left eye (digital illustration based on computer tomography)

Oglakhty examples are unique. The masks not only covered the faces but also the ears of the deceased. In order to make the masks a thin layer of plaster mixed with limestone and quartz sand was rubbed on the face and increased by incremental layers, covered by a final thin overcoat of pure plaster and then painted. Scraps of a greenish silk fabric placed on the right eye and the mouth are visible through breaks in the man's mask and a fragment of fabric on the left eye was also recorded by the computer tomography which identified the impressions of creases on the interior of the mask (Figure 6.2); such scraps and their impressions have been also found previously in burials at Oglakhty and other early Tashtyk cemeteries.[14] A rectangular cut had been made at the top of the man's mask and a thick strand of wavy chestnut hair rises from it. On the rest of the head not covered by the mask there is short hair of uneven length. The man's head was covered by a cap with earflaps and a back pad carefully sewn from fragments.[15] It is decorated with a ribbon sewn from strips of blue and yellow silk passed between the leather laces of the pompon. A rectangular fur panel made of fragments of sable skin are roughly stitched to the cap band to form a funerary cover over the face of the deceased and above the mask.

The man was dressed in two fur coats sewn from small rectangular fragments.[16] The lower coat of sheepskin or the skin of a domestic goat[17] was nearly 105 cm in length with the fur on the inside. The upper coat is of reindeer hide with the fur on the outside. Both coats have erect collars measuring up to 5–6 cm high and passing into the breast at the front (Figures 7–8). The breast facings and sleeve cuffs are trimmed with narrow strips of fur. The inner coat features a narrow yoke with decorative details in the form of three-toed paws covering the shoulder stitches and figured appliqué on the collar covering the joins between the pieces of leather (Figure 8.2–3). There is a leather tie on top of the left facing. Beneath the man's shoulder was a small child's fur coat with an upstanding collar and flaps lengthening

[14] Adrianov 1903*b*; Vadetskaya 2004: 54–57, figs 3–4, 6.
[15] Simpson and Pankova eds 2017: 347, cat. 263.
[16] Pankova 2020*b*.
[17] Here and hereafter all the definitions of fur are by Nikolay Vereshchagin of the Russian Academy of Sciences Zoological Institute. The definitions were made in 1970 on the basis of the features of the external appearance. A longer paper on the fur items has been recently published: Pankova 2020*b*.

Figure 7. Fur outer coat of the male mummy, L 105 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/72)

towards the centre.[18] On the man's chest was a bib made of small scraps of squirrel, polecat, sable and otter fur, held at the neck by leather laces (Figure 9). On his hands there were double-layered fur mittens with thumbs and strips of red leather across the wrist, each with a pair of leather or silk bindings (Figure 10).[19]

The sheepskin or goatskin trousers with fur on the inside were preserved slightly below the knees. They have frontal relief stitching on the legs, symmetrical semi-circular details on the sides like false pockets and tucks (Figure 11). The front part consists of small scraps of fur. The two sashes or belt loops? were apparently used to thread a belt and for fastening the trousers to the waist, although no proper belt has been found – only narrow straps with leather imitations of buckles painted in red lay on top of the trousers.[20] It is not clear whether they were used in his lifetime or were funerary models. The trousers were fixed around the knees with broad straps with a stamped pattern stitched along the centre. The lower part of the leather footwear has also survived: of particular interest is the design of the sole which is in the form of a figure of eight with a low ridge around the border and along the centre (Figure 12).

The man's body was covered in tattoos (Figure 13.1).[21] It is entirely possible that tattoos or painting covered

1

2

3

Figure 8. Fur inner coat of the male mummy, L 105 cm: 1, front view; 2, detail, yoke fragment with decorative detail in the form of three-toed paw; 3, detail of collar with decorative applique (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/73)

[18] Simpson and Pankova eds 2017: 348, cat. 264.
[19] Simpson and Pankova eds 2017: 349, cat. 265.
[20] Simpson and Pankova eds 2017: 350, cat. 266.
[21] Pankova 2013; 2017; Simpson and Pankova eds 2017: 344, fig. 195.

Figure 9. Fur bib of the male mummy, L 60 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/67)

Figure 10. Leather and silk mitten from the right hand of the male mummy (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/76)

Figure 11. Leather trousers of the male mummy with straps, L 77–86 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/69)

the faces of the deceased under the masks, which was also reflected in the painting of the latter, but the impossibility of removing the masks without destroying them prevents this question being clarified. An anthropological examination of the man's head carried out by Dr I. Shirobokov of the Russian Academy of Sciences Museum of Anthropology and Ethnography on the basis of the computer tomography concluded that his craniometric characteristics closely resemble those in the Saragash stage of the Tagar culture in the Scythian period and, to a lesser extent, to a series of earth cemeteries of the immediate post-Scythian Tes' culture.[22] In his physical characteristics this man therefore represents the local group of the population which also corresponds to the ritual of his burial. As already stated above, the majority of inhumations in early Tashtyk graves were female burials, so this

[22] The results of the examination are being prepared for publication. I am very grateful to Dr I. Shirobokov for the possibility of publishing the preliminary information.

Figure 12. Leather footwear of the male mummy, max L of sole 22 cm, 1, left; 2, right (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/74)

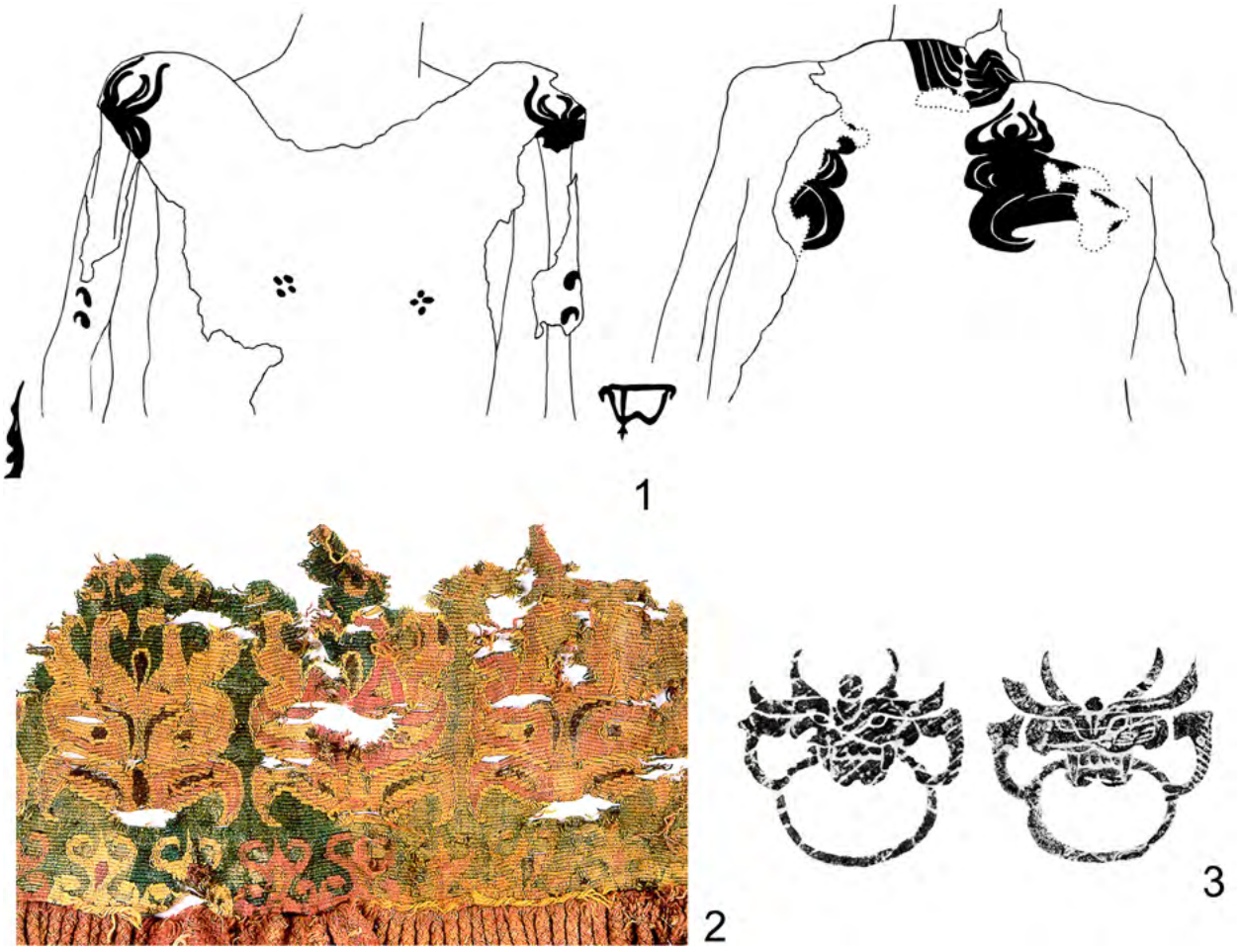

Figure 13. Tattoos on the male mummy from Grave 4 and their parallels: 1, tattoo, tracing by S. V. Pankova; 2, woollen tapestry from Grave 92LS II M3 at Sampula (after Schorta 2001); 3, details of funeral reliefs from China, 2nd century (after Finsterbusch 1971)

Figure 14. Fur coat of the female mummy, L 130 cm: 1, front; 2, detail of inner side of the coat; 3, detail of yoke with decorative details in the form of three-toed paw (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/77)

man is one of the few exceptions. What is behind that has yet to be elucidated: to all appearances there were other factors besides gender which determined the method of burial.

The woman was also dressed in a long goatskin coat measuring 130–140 cm in length with a woollen skirt made from horizontal strips of fabric. The coat thrown over the woman's shoulders was made of rectangular fragments with the fur on the inside (Figure 14.1–2). The breast facing of dark wolverine or bear fur passes into an erect collar and wedge-shaped strips which widen the hem were inserted into the side seams. The shoulder seams are covered with strips of leather with ends in the form of three-toed paws, apparently from a yoke which has not survived (Figure 14.3). On the upper part of the left breast facing is a fragment of a leather tie.

The skirt was made of at least two horizontal layers – fragments of red and brown tabby textiles. At the waist the skirt could be tightened by a lace or strap pulled through a folded-over hem of the fabric, the ends coming through a hole framed by a leather overlay (Figure 15). The strap has not survived or was perhaps removed from the skirt before burial, and this feature resembles the missing belt from the trousers of the male mummy.

Under the woman's head was a plait consisting of a chignon woven onto a frame fixed to a pigtail rolled in a tangle, evidently cut from the woman's head. Judging by an X-ray, the frame of the chignon was a horseshoe-shaped strip of leather or fur rolled into a tube.[23] To the left of the woman's head lay a cap, almost identical to the man's but lacking a pompon. However, the cap is not so well preserved: the back of it has been lost, and it is not clear whether there had been one. A skin was sewn to the front and formed a cover over the face. Unfortunately, it is unknown whether the cap belonged to the woman or the mannequin 1 as it was found between the two (Figure 3.1). The latter is more likely in my opinion and is discussed further below.

Wooden blocks were placed as head-rests under the heads of both mummies (Figure 16.1), with stone slabs beneath them.

[23] Simpson and Pankova eds 2017: 346, cat. 262; Pankova 2018: 134, fig. 1.5.

Figure 15. Skirt fragment of the female mummy, wool, leather, H 42, W 88 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/63)

Figure 16. Headrests of the dead persons: 1, wooden block beneath the head of the male mummy, L 40 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/37); 2, cushion beneath a head of mannequin 2. Leather, grass, L 46 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/20)

Cremations: mannequins

The two mannequins in the grave were anthropomorphic dummies up to 1.6 m in height and each formed of tightly twisted plaits of cereal stalks covered with leather to resemble a human body.[24] The mannequins were dressed in fur clothing which probably previously belonged to the deceased. Cremated human bones were placed inside leather cases which had been inserted through special slits into the chests of the dummies and which were then sewn up.

Mannequin 1 lay in the centre of the grave and is almost completely preserved (Figure 4). The front part of its leather head – its 'face' – is covered with red woollen fabric on which horizontal black stripes have been drawn in charcoal and a rolled-up piece of leather sewn under the fabric to indicate the nose. The back of the head has not survived, and from the back of the face it can be seen that slits were made in place of the eyes. The leather ears are covered with separate scraps of a different red woollen fabric (Figure 17). A fragment of polychrome fabric measuring 4.5 x 4 cm survives on top of the head and is stitched around three sides to form a sort of pocket (Figure 17.2); the fourth side of the silk has been torn off but thanks to the threads preserved in the stitches connecting it to the leather head it is possible to reconstruct the original shape and size of this silk detail: it was rectangular and measured 4.5 x 11.5 cm. There was a compacted bundle of grass inside. In addition, a rolled-up plait of human hair with a fragmentary wooden peg or pin inserted crosswise in the centre was found on the mannequin's body: in the excavator's opinion this had been dragged from the head by rodents. It is likely that the plait was cut from the head of the deceased before cremation and placed on the leather mannequin in the same way as it had been worn during the man's life (Figure 18).[25] The plait on the head was most likely covered by the silk; fragments of silk, evidently from similar covers, as well as miniature leather pouches containing hair were also found during the 1903 excavations.[26]

The mannequin was dressed in a coat nearly 93 cm long made of scraps of hair from the legs of a roe deer, with a stiff collar and a leather tie across part of the chest on the left facing (Figure 4). The remains of goatskin trousers with frontal stitches are also preserved. The

[24] Shishlina *et al.* 2016: 685.

[25] Kyzlasov 1969*b*: 44.

[26] Vadetskaya 1985: 11; they are in the collection of the Krasnoyarsk Local History Museum. I am very grateful to Dr Nikolay Makarov, curator of the Oglakhty collection, for the opportunity to examine these materials.

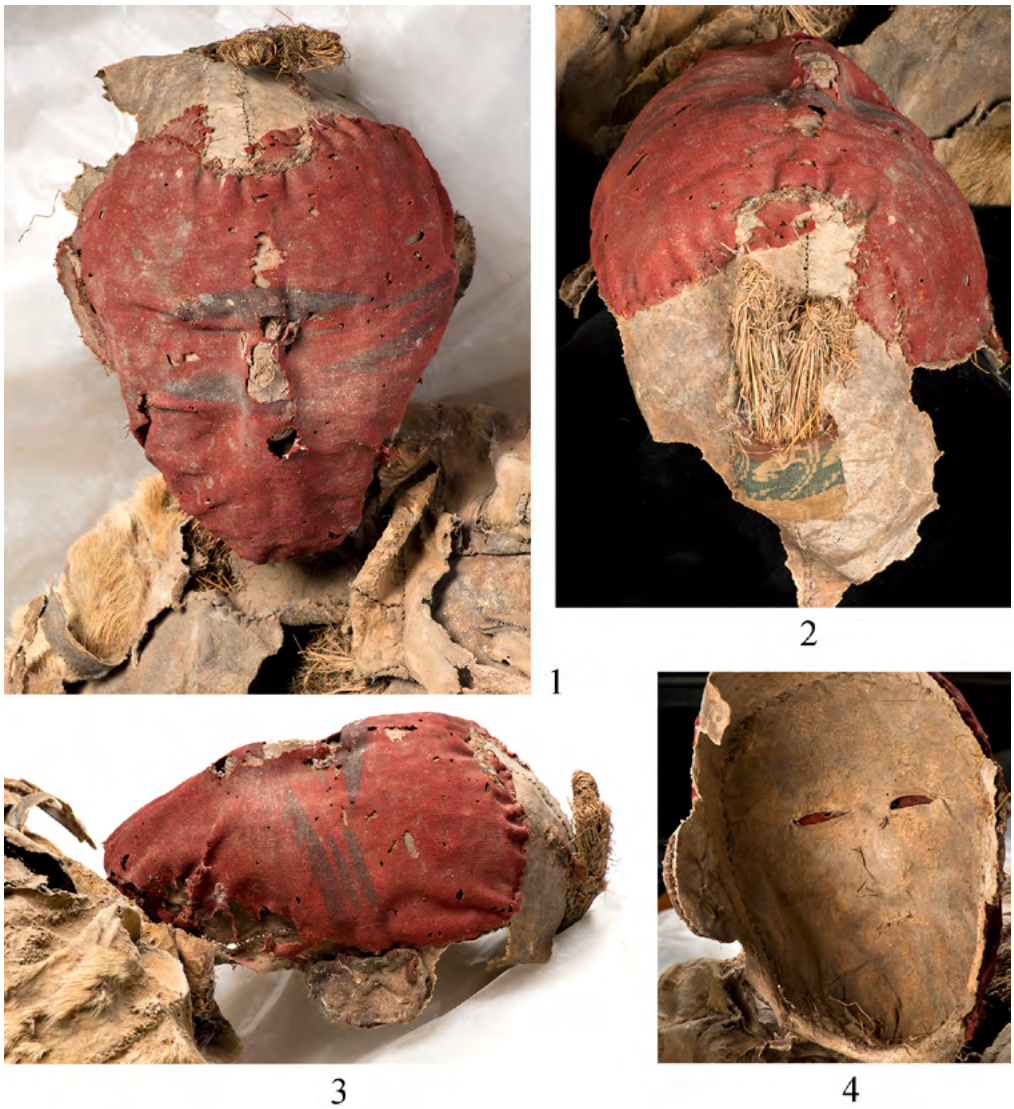

Figure 17. Head of mannequin 1. Leather, grass, woollen fabric, tendon thread, silk. 1: face; 2: top head with silk plait decoration; 3: side view; 4: reverse side of the face (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/78)

Figure 18. Plait of mannequin 1 with fragment of a hairpin. Hair, wood. L 8.6 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/34; drawing by Nataliya Balaban)

boots, which reached up to the middle of the shin, were tied at the top by a leather strap which ran into the bend of the boot's legs, the ends going into holes (Figure 19). The top of the toe is sewn from fragments and an edge part of a sole with a low ridge survived. A fur hat with a veil found between the mannequin and the female mummy may have belonged to this mannequin whose head was turned to the side, so that the hat lay on the very top of its head (Figure 3). Besides that, both the mannequin's head and the hat are completely destroyed at the back; and finally, if rodents moved the plait from the mannequin's head, they may also have moved the hat.

Mannequin 2 was not so well preserved: the head and feet had been almost completely lost and the upper torso area had been destroyed, so that the cremated bones were bare and scattered (Figure 20.1). Nevertheless, there is enough preserved to indicate that this mannequin had been dressed in an 80 cm half-

Figure 19. Leather footwear fragments from the left foot of mannequin 1 (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/78)

length coat made of fragments of goat and reindeer hide. The outer face of the upstanding collar which extended onto the chest was decorated with figured applique (Figure 20.2–3). The skirts which survive in their full length have edges sloping towards the centre and are trimmed with a strip of kidskin along the bottom. The trousers are made with fur inside and have frontal stitches on the legs, and at the front, assembled from fragments, semi-circular stitches reminiscent of the lines of pockets and tucks at the sides. There is a loop in the central part of the trousers (Figure 21).

The bare cremated bones from mannequin 2 weighed about 1 kg and had been placed inside a rectangular leather pouch (Figure 20.4). They included fragments of all parts of the skeleton and belonged to a man aged between 20 and 40 years at death.[27] The bones from mannequin 1 have yet to be examined, but the trousers on this mannequin may suggest that it accompanied the burial of a man as the woman was buried in a skirt, and this is supported by the similarity of its face and hairstyle to the mask and hairstyle of the male mummy (Figures 6.1, 17.1). Beneath the mannequins' heads were rectangular leather cushions filled with dry grass or reindeer hair and placed on top of stone slabs (Figure 16.2).[28]

With mannequin 2 there was a model of a *gorytos* trimmed along the upper opening with polychrome silk, and containing five arrow shafts and imitations of a bow and a whip (Figure 22.1).[29] Possibly next to this mannequin was a 'fragment'[30] or 'small fragments'[31] of polychrome silk (the data from Leonid Kyzlasov's report differ from the information recorded from his words by Krishna Riboud), obviously all these separate pieces available in the collection (Figure 23). All these fragments are of traditional Chinese *jin* fabrics, distinguished by their complex weaving (warp-faced compound tabby), bright colours and rich patterns. These fabrics were especially valued in China, where their production reached its zenith in the Eastern Han (AD 25–220) and Wei-Jin (AD 220–317) periods.[32] They are found mainly in burials in the Tarim Basin (Xinjiang-Uyghur Autonomous Region), where analogies to the Oglakhty fragments are also found.[33] The silk fabrics found in Grave 4 are summarised below (Table 1).

As we can see, fragments of silk fabrics were mainly used in funeral rituals: they covered the eyes and mouth before the application of the funeral mask, formed part of the hairstyle of the mannequin and decorated the funerary model of a *gorytos*. Most of the silk fragments, including all the polychrome ones, relate to the mannequins. Silk fabrics were also found at Oglakhty during the 1903 excavations[34] and in some other cemeteries.[35] To all appearances, the early Tashtyk population had a special attitude towards silk which, for some reason, was considered particularly appropriate for accompanying its owner into the next world. The manufacture of a narrow trim of five fragments for the *gorytos* is evidence of the careful use of even the smallest fragments of these precious fabrics. The wide use of silk, including polychrome silk, in early Tashtyk funerary rituals may have been one of the innovations of that time connected with the traditions of an incoming group.

[27] Determination by Dr I. Shirobokov. The results of his examination are being prepared for publication.

[28] Kyzlasov 1969*b*: 44, 47.
[29] Simpson and Pankova eds 2017: 351, cat. 267.
[30] Kyzlasov 1969*b*: 45.
[31] Riboud 1971: 34.
[32] Li 2012: 120–25.
[33] Pankova 2016: 61–63; Pankova and Mikolaychuk 2020.
[34] Tallgren 1937: 85, figs 22–23; anon. 1988: 152.
[35] Vadetskaya 1999: 227, 235; Gotlib 2007.

Figure 20. Mannequin 2. Leather, fur, grass. L 153 cm. 1: general view; 2: remains of the mannequin shoulders and neck and upper part of a fur coat; 3: applique on the collar; 4: pocket for the bone ash (The State Hermitage Museum, St. Petersburg)

Judging by the arrangement in Grave 4 and other early Tashtyk tombs, people buried according to different rituals were equal in status. What other differences, besides the method of burial, can be observed between the mummies and the mannequins? And what is the correlation between their clothes and the details of funerary practice?

Mummies and mannequins: characteristics of funerary practice

Apart from the method of burial, the available characteristics of funerary practice are reflected in the head cushions, the design of the faces of mummies and mannequins and the use of face coverings. One undoubted difference between the funeral practices of people buried by inhumation and cremation were their different headrests: wooden blocks beneath the heads of mummies whereas leather cushions were used for the mannequins.

The method of designing the faces of the deceased had more common features than differences. In the mannequin whose head has survived and the male mummy the 'faces' – fabric and plaster – are surprisingly similar: they are both bright red in colour with horizontal black stripes: two wide stripes in the middle of the face, two or three narrow ones running

Figure 21. Trousers of mannequin 2 with a detail (a loop), fur, L 80 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/68)

from the left ear to the middle, with three additional oblique branches at the bottom (Figures 6.1, 17.1). Both the mask of the mummy and the face of the mannequins covered not only the face of the deceased, but also the ears. The difference therefore is only in the material. The face of the mannequin imitates a mask, at first glance, but because the mannequins include an actual burial, this probably indicates the transference of a common method of the design of the deceased's face.

The unclear attribution of one of the hats does not enable us to make a confident judgment about the use of face coverings in the funeral dress of mannequins. If the hat belonged to the mannequin (which seems to me more reliable), the face coverings used in the funeral rites for the male mummy and the mannequin were identical.

Mummies and mannequins: details of dress

The elements of dress of the deceased in Grave 4 are clothes, footwear, hairstyles and tattoos. The above-mentioned similarity in the posthumous design of the faces of the male mummy and mannequin 1 also applies to their reconstructed hairstyles. It is noticeable that the rectangular outlines of the silk plait cover on the mannequin's head, continuing on the red background of the face fabric, are similar to the cut in the mask on the mummy's head which frames a thick strand of hair (Figures 6.1, 17.1). Most probably, when the mask was made the shape of its upper part was determined by the hairstyle of the dead man. The wavy character of the hair in the cut in the mask suggests that it had been woven into a plait for a lengthy period.[36] It is likely that the hairstyles of the men buried in Grave 4 in the form of a mummy and a mannequin were of the same type.

The fur clothing, common to both mummies and mannequins, consists of five coats, three pairs of trousers, footwear and possibly hats. They are all painstakingly sewn from rectangular fragments of fur in small stitches of tendon threads, have neat patches and obviously represent everyday clothing. A distinctive feature of all the fur coats is an erect collar which passes onto the breast facing which is also trimmed with a thin fur strip of fur. Leather laces have survived on the facings of the coats of both mummies and mannequin 1, showing the identical way the sides

[36] The plait may have come loose after the hat was removed when the mummy was conserved in the State Hermitage Museum: unfortunately, there is no record of how the conservation was done or the removal of the clothing.

Figure 22. Imitation bow case edged with silk. Leather, silk, wood, feather. L 41.5 cm: 1, general view; 2–3, details of silk fragments (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/21)

were joined. The coat of mannequin 2 and the outer coat of the male mummy have identical decoration on the collar in the form of figured leather overlays which cover the joins between fragments (Figures 8.3, 20.3). The coats of the mannequins and, to all appearances, the child's coat are similar in cut to the adult coats and feature the characteristic obliquely cut sides which become longer towards the centre.

The fur coats of both mummies have a characteristic yoke with epaulettes in the shape of three-toed paws. This seems to be the only detail that distinguishes these from the coats worn by the mannequins but it is difficult to say how significant this is. The clothing of the male mummy also differs by its bib and the presence of two coats rather than the single one worn by the mannequins. However, this difference is hardly substantial as the burial outfits of the mannequins (and also apparently that of the female mummy) may be incomplete. The materials we have therefore suggest similarities rather than differences in the shoulder wear of the mummies and the mannequins.

All three pairs of trousers – of both mannequins and the male mummy – have fur inside and identical frontal relief stitches, but the better-preserved trousers of the male mummy and mannequin 2 have a whole range of identical details. Despite minor differences, the cut of the trousers of the mummy and the mannequins is identical.

The footwear of the male mummy and mannequin 1 can only be partly compared because of their state of preservation: the toes of both pairs are stitched in the same way up to the instep and the soles have similar raised edging (Figures 12, 19). The mannequin's 'boots' are attached to the feet by straps running into the bend at the top of the shin, i.e. in the same way

Figure 23. Fragments of polychrome silk found next to one of the mannequins (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/58-61)

with a pompon edged with a silk ribbon and his right mitten with its silk laces.

Therefore, despite some individual differences, most of the comparable details of costume – the clothing, footwear and hairstyles of the male mummy and the mannequins – show considerable similarities. All of the clothing and footwear were, on the whole, identical and made of the same materials, namely the skins of domestic and wild animals found in this region of southern Siberia, and evidently by the same people. It may be supposed that the Oglakhty population's methods of making clothes and footwear reflected local Minusinsk traditions and that they were probably made by women.

Surprisingly, some characteristics of the fur coats and hats are reminiscent of well-known examples from the earlier Scythian period: for instance, the obliquely cut sides of fur coats or caftans lengthening towards the centre are recorded on toreutic and gold clothing appliques depicting Black Sea Scythians.[37] Hats with earflaps and hoods with back flaps were typical of the pastoralist nomads of the Scythian period over a wide territory and are also well known from toreutic of the western steppes and Iranian reliefs depicting Sakas, as well as from items of clothing from the Pazyryk barrows and the Xinjiang burials from the 1st millennium BC.[38] The model of a *gorytos* found with mannequin 2, with a wooden stick inserted to give rigidity and loops for suspension, an oblique top and compartments for arrows, also copies real examples known both from

Mummies / Mannequins	Plain silk	Polychrome silk
Male mummy	1. Fragments of green silk under the mask – on the eyes and lips (Figure 6: 1) 2. Ribbon of blue and yellow silk on the hat 3. Laces on the fur mitten of the right hand (Figure 10)	–
Female mummy	–	–
Mannequin 1	–	Pocket for the plait (Figure 17.2)
Mannequin 2	–	Trimming on the model of a *gorytos* (Figure 22.1–4)
Mannequin 1 or 2 (not precisely clear)	–	Small rectangular fragments of five fabrics (Figure 23.1–4)

Table 1. Summary of the silks found in Tomb 4 at Oglakhty

that the woman's skirt was held onto her waist. This characteristic may be typical of the costume of the population of the Minusinsk Basin judging by the wide use of laces in general, for instance for connecting the sides of a fur coat, the earflaps of hats, fixing mittens and trousers below the knees. Another characteristic, although decorative rather than functional, is the use of silk details on fur clothing, such as the man's hat

central Asia and Black Sea pictorial versions, both dating to the Scythian period.[39]

[37] Alekseev 2012: 134, 246–47, 154–55, 161–61, 194, 198–99; Simpson and Pankova eds 2017: 204, 206–207, cats 117, 119.
[38] Alekseev 2012: 192–93; Simpson and Pankova eds 2017: 132–33, fig. 69; Polosmak 2001: figs 105–107; Wang ed. 1999: 102.
[39] Alekseev 2012: 135, 190, 194; Wieczorek and Lind eds 2007: 181, cat. 82

Thus the costumes of the male burials from Grave 4 and the characteristics of their funerary practice are very similar for the two mannequins and the mummy. The only obvious difference, besides the method of burial itself, is in the character of the headrests: wooden billets for the mummies, leather cushions for the mannequins. The extent to which this is significant will be shown by future exploration of burials with surviving organic material.

If we consider the mummies and mannequins as burials of people of different origins, the substantial similarity in their appearance may be explained by the Oglakhty cemetery dating to the middle or late stage of the early Tashtyk period,[40] when incoming people had either already mixed with or assimilated into the local population. Individuals buried in the form of mannequins no longer belonged to the generation of immigrants but to their descendants. Either the cultural differences between the local population and the incomers had been eroded by the time the Oglakhty cemetery was built or the traditions of one of them had become predominant. Who borrowed what from whom is difficult to assess but the new practices introduced by the immigrants may have already been adopted by the local population so parallels with specific features of the Oglakhty burials outside the Minusinsk Basin may be linked with both mannequins and mummies.

The search for the sources of the principal new introduction – the ritual of cremation in the Minusinsk Basin – is complicated by the fact that finds of cremated burials in neighbouring and even remote territories are isolated and as yet not understood,[41] or the context of cremations and accompanying paraphernalia cannot be seen as prototypes for the early Tashtyk examples;[42] and finally, cremations are easily destroyed and may have remained undiscovered.

Does the predominance of male cremations in early Tashtyk cemeteries indicate the cruel fate suffered by local men with the arrival of the supposed immigrants? At the moment this question is difficult to answer but it must not be forgotten that in parallel with the Oglakhty residents in the Minusinsk Basin there were other groups of population buried in so-called Tes' cemeteries and burial mounds.[43] It may be that the local men and their descendants were connected with these groups.

Parallels for materials from early Tashtyk burials from the Tarim Basin and Dzungaria

During the course of research on the silk fragments from the Oglakhty cemetery and the search for their analogies in sites in the Tarim Basin,[44] a number of similarities have been noted between some of the materials found in well-preserved burials in that region and in neighbouring Dzungaria with those from the Minusinsk Basin. The majority of these instances look like isolated analogies, but when reviewed as a whole they may make up a more revealing picture indicating the areas of the spread and origin of the traditions which defined this new culture in the middle Yenisei.

Most of the vessels of the new type in earth graves of the Oglakhty type have no specific analogies that would indicate their provenance. However, one characteristic group may be significant: these consist of elongated vessels with straight necks and spouts decorated with relief ornaments of 'rope' cylinders (Figure 24.1–3). On one hand, they resemble wooden barrels with tall narrow necks plugged with wooden corks, known both in the Oglakhty burials (Figure 24.6)[45] and in burials of the same period from Tuva.[46] On the other hand, the round sides of many Minusinsk vessels and the 'rope' pattern are reminiscent of leather bottles or flasks used by nomads. However, the closest parallels are pottery vessels from burials in Dzungaria dating to the Han period (Ili Kazakh Autonomous Prefecture, Xinjiang-Uyghur Autonomous Region) (Figure 24.4–5),[47] and judging by their narrow necks these are closer to wooden or leather prototypes than the Minusinsk examples. Pottery vessels of comparable shapes are also known in the Steppe Altai region during the Scythian period.[48]

However, most of the parallels come from sites dating to the early centuries AD from the Tarim Basin, from the southern and eastern districts of Xinjiang. The model of a *gorytos* from Grave 4 at Oglakhty is edged at the top with a strip of polychrome silk. A similar method of decorating a full-size *gorytos* was recorded in Grave 8 of the Niya cemetery (95MNI M8) in the south of the Tarim Basin (Figure 25).[49] Interestingly, the riser of the bow from the same *gorytos* also had strips of silk wound around it.[50] It should be noted that the same grave at Niya also yielded a silk pouch made of '*ban wen jin*' fabric of Chinese origin ('polychrome silk with a tiger-skin pattern'),[51] similar to the fragments from Grave 4 at Oglakhty (Figure 23.4).

In the settlement of Niya, where the above-mentioned cemetery is located, examples of furniture were found whose carved decoration are similar to the rare specific

[40] Vadetskaya 1999: 66–69.
[41] Kyzlasov 1979: 99, 114–15; Semyonov 1979.
[42] Shirin 2003: 131–32, 138–42.
[43] Vadetskaya 1999; Savinov 2009; Kuzmin 2011; Uchaneva *et al.* 2017.
[44] Pankova 2016: 61–63; Pankova and Mikolaychuk 2020.
[45] Tallgren 1937: 79, fig. 9a.
[46] Vainshtein and Diakonova 1966: 256, pl. IX; Diakonova 1970: pl. VII, colour inset after p. 11.
[47] Qi and Wang eds 2008: 246, 256, figs 4–5.
[48] Shulga 2015*a*: 73–74.
[49] Zhao and Yu eds 2000: 49, no. 15.
[50] Zhao and Yu eds 2000: 49, no. 14; Selbitschka 2010: table 59.15–16.
[51] Zhao and Yu eds 2000: 87, no. 42; Pankova 2016: 62, fig. 10.

Figure 24. Vessels from early Tashtyk graves and their parallels: 1, Oglakhty, Grave 4, pottery, L 25 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/7); 2, Gorkoye Ozero, Grave 13, pottery, H 16 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 4319/3); 3, Abakan 8, Grave 2, pottery, L 20.5 cm (after Amzarakov and Kovaleva 2016: fig. 18); 4, Zhaosu County, Ili-Kazakh Autonomous Prefecture, Xinjiang-Uyghur Autonomous Region, China, '77 Regiment', 2000, pottery, L 21.5 cm (after Qi and Wang eds 2008: 246, fig. 4); 5, Zhaosu County, Ili-Kazakh Autonomous Prefecture, Xinjiang-Uyghur Autonomous Region, China, Xiatai, Grave 38, 1973, pottery, H 20 cm (after Qi and Wang eds 2008: 256, fig. 5); 6, wooden vessel from Oglakhty, Grave 1, L 28.5 cm (State Historical Museum, Moscow, photograph from the SA IHMC RAS Photographic Department, neg.III 9109)

Figure 25. *Gorytos* with containers for arrows and silk edging. Grave 8, Niya cemetery, Xinjiang. Leather, silk (after Zhao and Yu eds 2000: 49, no. 15)

depictions from the Minusinsk Basin in the early Tashtyk period (Figure 26.3–4).[52] On a birch-bark 'purse' from the Chernoye Ozero II cemetery, which contained a vessel, a human tooth and a pair of burnt bones,[53] was a carving of a wild beast with its tail along its back and characteristically bent paws (Figure 26.1). An analogy for the beast from Chernoye Ozero in the pattern of a silk fabric from cemetery LC near Loulan has already been noted,[54] but textile patterns often also convey images which are rendered in other materials. In addition to the furniture from Niya, numerous depictions of animals possessing named signs are carved on eastern Han funerary reliefs in different provinces of China.[55] These characters were evidently significant both in mainland China and in the neighbouring Western Region. Many of the animals – on reliefs, furniture and fabrics – have wings which are often depicted as long narrow spikes. This detail brings them closer to other Minusinsk depictions from the early centuries AD on the rocky outcrops of Mount Kunya (Figure 26.2).[56] Analogies of the latter are depictions of 'unicorns' from belt plate-buckles found over a wide territory from northwest China and Transbaikal to Tuva and linked with the Xianbei Empire.[57] However, the figures on the buckles lack such details as the bent paws and the tail along the back, so the figures on the furniture from Niya appear the more likely analogies for the early Tashtyk depictions.

The figures on the tattoos on the shoulders and shoulder-blades of the male mummy from Grave 4 at Oglakhty appear equally foreign compared to the Minusinsk tradition (Figure 13.1). The closest analogies to these are again from the Tarim Basin, such as the depictions on a woollen fabric from the Sampula cemetery (Grave 92 LS II M3) in the Khotan oasis and dating to the early centuries AD (Figure 13.2).[58] The fabric figures are ornamentally stylised fantastic masks whose prototypes can be found in Han depictions reminiscent of ancient 'taotie' masks (Figure 13.3).[59] The similarity between the tattoos and the fabric figures from Sampula is so close that it can hardly be a coincidence. The deliberate way in which tattoos were applied in traditional societies makes it possible to propose that these images had an important meaning for the inhabitants of the Minusinsk Basin who wore them. These specific tattoos are available on the body of the man buried according to the local ritual of inhumation and the local group had evidently already copied these images from the incomers.[60] They may also be presumed to be on the bodies of the men buried as mannequins although direct evidence is of course lacking as they had been cremated. The custom of tattooing the hands and body and tattooing and painting the face existed both in the population of Xinjiang[61] and in the Scythian cultures of Eurasia,[62] although no evidence of this has survived in Tagar materials of the Minusinsk Basin.

In general, a whole series of parallels to the Oglakhty finds can be identified in the Sampula materials. The

[52] Stein 1921: vol. IV, pl. XVIII; Qi and Wang eds 2008: 51, fig. 9.
[53] Gotlib 2006: 78.
[54] Gotlib 2006: 79–80.
[55] Finsterbusch 1971: pl. 27, figs 99–100, pl.13, fig. 175–76, pl. 68, fig. 261, pl. 94, fig. 325, pl. 112–13, fig. 390–98, pl. 115, fig. 408; pl. 130, fig. 491; pl. 118, figs 427–28; pl. 149, fig. 553.
[56] Miklashevich 2004: 322, fig. 1.
[57] Miklashevich 2004; Boardman 2010: pl. 44: 333.
[58] Schorta 2001: 87, fig. 92.
[59] Finsterbusch 1971: pls 28, 35, figs 107–108, 138–39.
[60] Pankova 2013.
[61] Wang ed. 1999: 58, 89; Mallory and Mair 2008: 142, 189, 192–93, pls I, VII–VIII; Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001: 237, fig. 449.
[62] Pankova 2017; Yablonsky 2017.

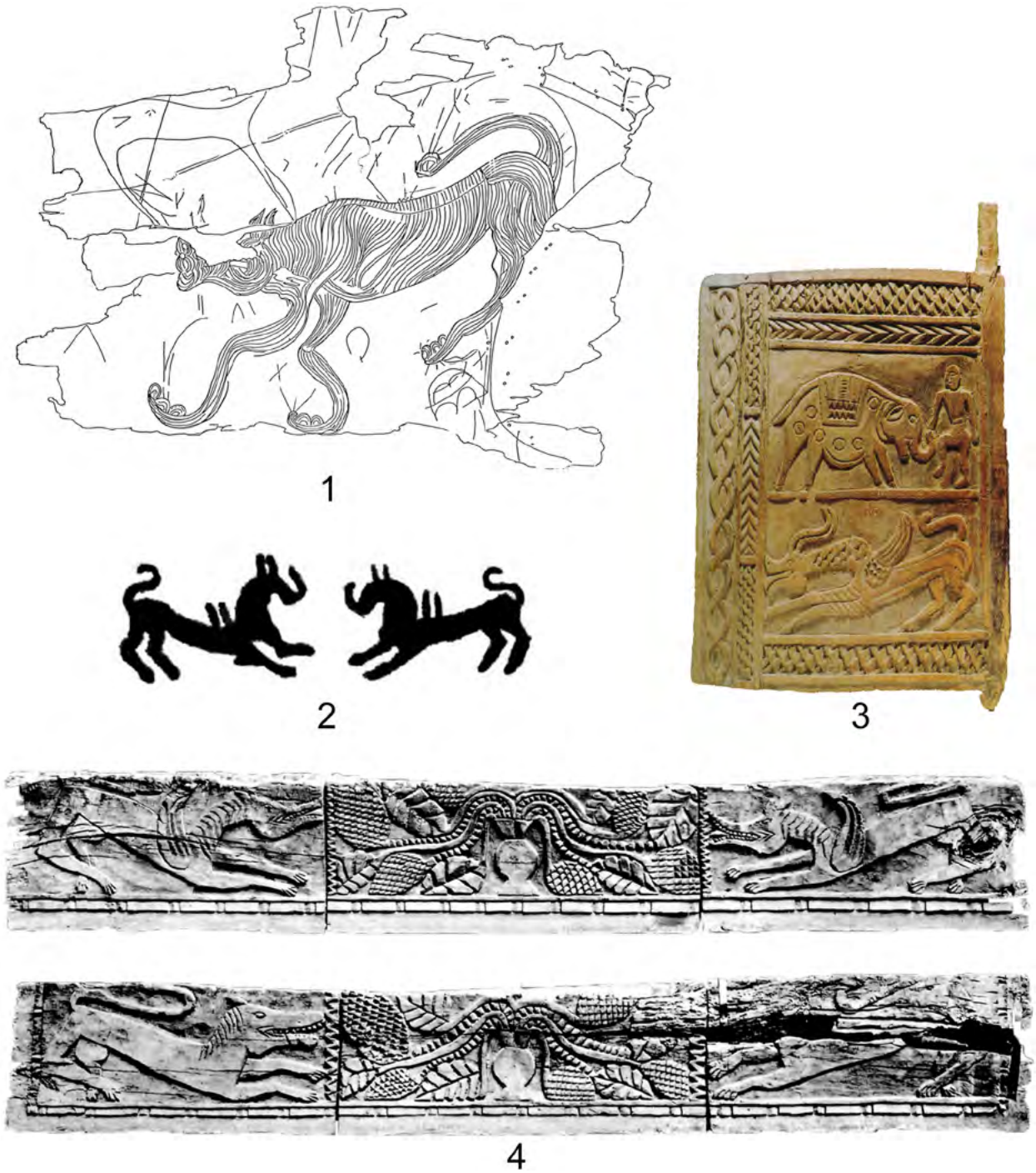

Figure 26. Depictions of animals with bent paws from the Minusinsk Basin and their analogies in monuments in Xinjiang, China. 1: carved figure on a birch-bark purse from the Chernoye Ozero II cemetery, Kurgan 5, Grave 9 (after Gotlib 2006); 2: figures pecked into the rock faces of Mount Kunya (after Miklashevich 2004); 3: wooden door of a sideboard, H 24 cm, Niya, Mingfeng, China (after Qi and Wang eds 2008: 51, fig. 9); 4: details of wooden furniture from Niya XXVI, iii, 1. L 254, W 22.2 cm, depth 36.8 cm (after Stein 1921: vol. 4, pl. XVIII)

sole of a leather shoe from one of the graves has a lengthwise seam similar to that on the Oglakhty boots (Figures 12, 27.3). A wooden spouted bowl found in another grave is similar to one from Oglakhty (Figure 27.4–5). In burial 92LS II M3 a wooden bed was found with four vertical legs and horizontal logs with slits for the cross slats (Figure 28): similar details made up the funerary bed in one of the graves in the Oglakhty cemetery.[63] The pattern on a felt bag from Sampula is similar to the decoration on a bone hilt from the early Tashtyk Komarkova cemetery (Figure 27.1–2). Several of the Oglakhty graves contained wooden models of daggers in red-painted four-lobed scabbards (Figure

[63] Adrianov 1903*b*; currently kept in the Krasnoyarsk Territory Local History Museum.

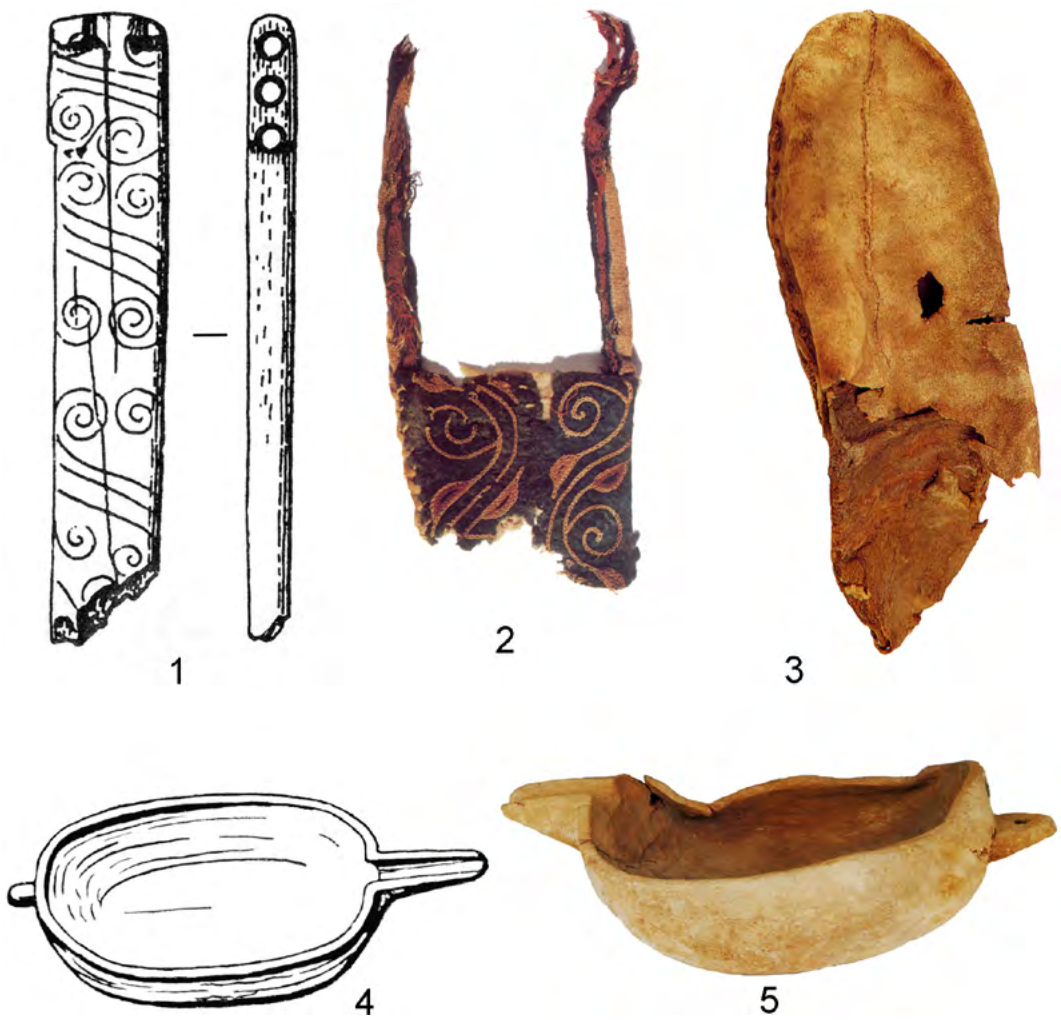

Figure 27. Parallels to materials from early Tashtyk cemeteries in the Sampula cemetery: 1, bone handle of a brush with carved pattern, L 9.5 cm, Grave 16, Komarkova cemetery (after Vadetskaya 1999: 37, fig. 19: 7); 2, felt bag with embroidery, Sampula 84 LS I M01 (after Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001: 139, fig. 233); 3, leather sole, Sampula, 84LS I M01 (after Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001: 236, fig. 447); 4, wooden spouted vessel, L 25.5 cm, Oglakhty cemetery, 1903 (after Vadetskaya 1999: 42, fig. 22: 4); 5, wooden spouted vessel, L 32 cm, Sampula, 84LS I M08 (after Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001: 112, fig. 157)

29.1).[64] The earliest daggers in scabbards of this type, as well as models of them, are found in Pazyryk tombs in the Altai mountains and probably Xinjiang but they are known further afield over a wide territory from northwest Afghanistan (Tillya Tepe) and western Siberia (Isakovka) to the Near East and the northern Black Sea.[65] The similarity of the Oglakhty models to those from Pazyryk has already been noted.[66] Whole sword-belt sets with red-painted leather lobed scabbards have been found in burials at Niya (Figure 29.2–4),[67] and it was probably these which were the prototypes for the wooden models from Oglakhty.

An interesting aspect of ritual was discovered during the conservation of the male mummy from Grave 4 at Oglakhty as a child's fur coat was found placed beneath the man's shoulders. Judging by the size of this coat, which would hardly have fitted a small child, and by the place it was found, it obviously had no connection with the six-year-old child buried there and it is more likely that it belonged to the man himself. It had been so painstakingly made with numerous patches that it gives the impression of a garment worn in daily life rather than a funerary item. Could it have been the man's coat he wore as a small child, carefully preserved in the family right up to his death? In this connection, the miniature silk caftans found on the chests of buried men in the Yingpan and Gaotai cemeteries in the east of the Tarim Basin should be noted:[68] although they

[64] Tallgren 1937: 83, fig. 20.
[65] The literature is reviewed by Treister 2010*b*: 515–21.
[66] Kubarev 1981.
[67] Zhong Ri Gongtong Niya Yiji Xueshu Kaochadui and Nitchū Kyōdō Niya Iseki Gakujutsu Chōsatai 1999; Zhao and Yu eds 2000: 16.
[68] Bao 1989: 5; Wieczorek and Lind eds 2007: 249, 260, cats 148, 162.

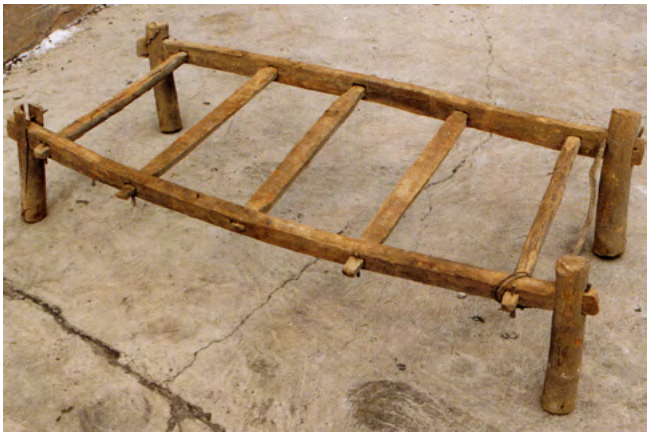

Figure 28. Wooden funerary bed, Sampula 92LS II M3 (after Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001: 63, fig. 11)

are more like models than genuine children's clothes the similarities of these and other ritual details are striking.

In the Yingpan cemetery silk fragments had been placed over the eyes of the deceased, as at Oglakhty.[69] Moreover, silk veils covered almost all the faces or were wound around the heads. This tradition had apparently already existed in the southern regions of the Tarim Basin in the 1st millennium BC according to leather and textile face veils found in the burials of Zhaghunluq and Dzhumbulak Kum cemeteries[70] and was even more widespread in the Han–Wei period judging by finds from the Sampula, Niya, Yanghai, Loulan and Astana cemeteries.[71] It should also be noted that a mask made of hemp fabric and plaster was found covering the face of one of the individuals interred in the Yingpan cemetery,[72] but the uniqueness of this instance in the Xinjiang materials means that it is not possible to draw any conclusions. The tradition of covering the eyes or faces of the dead may prove to be universal and therefore undiagnostic yet nothing similar has been recorded, for example, in the materials of the Pazyryk culture in the Altai mountains – despite their excellent state of preservation – so this parallel between sites in the Minusinsk region and the Tarim Basin is noteworthy.

Interesting coincidences can be found between early Tashtyk burials and materials from Xinjiang which relate to the previous period, namely the 1st millennium BC. There are analogies to the skirt belonging to the woman from Grave 4, consisting of horizontal red and greenish woollen panels found in the Zaghunluq[73] and Subeshi[74] cemeteries; it also compares with skirts found in Pazyryk burials.[75] This tradition was probably continued in the appearance of the skirts from Sampula.[76] Another but more surprising coincidence is in the painting of the face of a woman from the Zaghunluq cemetery and female Tashtyk masks with the depiction of a comma to the side of the nose (Figure 30: 1–2).[77] The custom of painting the face of the dead was found in many graves of Zhaghunluq[78] and in Dzhumbulak Kum.

These materials enable us to posit either the existence of common traditions among the population of the Tarim Basin and southern Siberia as early as the Scythian period and their reflection in the later Minusinsk sites on account of surviving organic material, or the manifestation of the Tarim traditions of the 1st millennium BC among the early Tashtyk population in the Minusinsk Basin.

Niya, Loulan and Yingpan are all cemeteries containing burials of one to four individuals interred in rectangular pits, troughs and wooden coffins. As with the Oglakhty burials, a number of objects were hung on wooden spikes,[79] which was also a characteristic of burials in central Asia during the Scythian period. The use of cushions trimmed with wool or polychrome silk was also typical of funerary rituals in the southern and eastern oases of the Tarim Basin.[80] The use of silk by the population of the Tarim Basin in the first half of the 1st millennium, both for everyday clothes and utensils and for making special funerary items such as cushions and face covers was fairly widespread. This is unremarkable given the contacts between the Tarim local kingdoms and neighbouring China. The common use of silk, including very small fragments, in funerary rituals in the Minusinsk Basin is less clear but possibly indicates to the special role of silk in the beliefs of these people or the expression of wealth and high social status of the deceased. It is as yet difficult to assess how silk fabrics, whether complete or fragmentary, circulated in the Altai-Sayan region because of the paucity of surviving and published finds. Considering the immigrant character of part of the early Tashtyk population and all of the analogies discussed above, I

[69] Wang ed. 1999: 162.
[70] Wang Bo 2016: 43; 141, fig.14; Polosmak 2012: 96. Face veils from Dzhumbulak Kum are of bright red colour exactly like the textile 'faces' of the Oglakhty mannequins.
[71] Wang ed. 1999: 129, 131, 137, 119, 177; Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001: 311, 426, 438.
[72] Wang ed. 1999: 152.
[73] Wang ed. 1999: 98; Wang Bo 2016: 146–47.
[74] Wang ed. 1999: 98
[75] Polosmak 2001: 115, fig. 85.
[76] Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001: 206–13, figs 403–408.
[77] Wang ed. 1999: 80–81; Vadetskaya 2009: pls 27, 28, 34; Istvan ed. 2013: 10–11, 32, 35, figs 3–5, 18–19.
[78] Wang ed. 1999: 75, 90; Wang Bo 2016: 43.
[79] Wang ed. 1999: 137; Selbitschka 2010: pls 59.17, 63.11, 72.12–13.
[80] Wang ed. 1999: 131–39, 140, 1436, 1526, 156, 161; Zhao and Yu eds 2000: fig. 3.34.

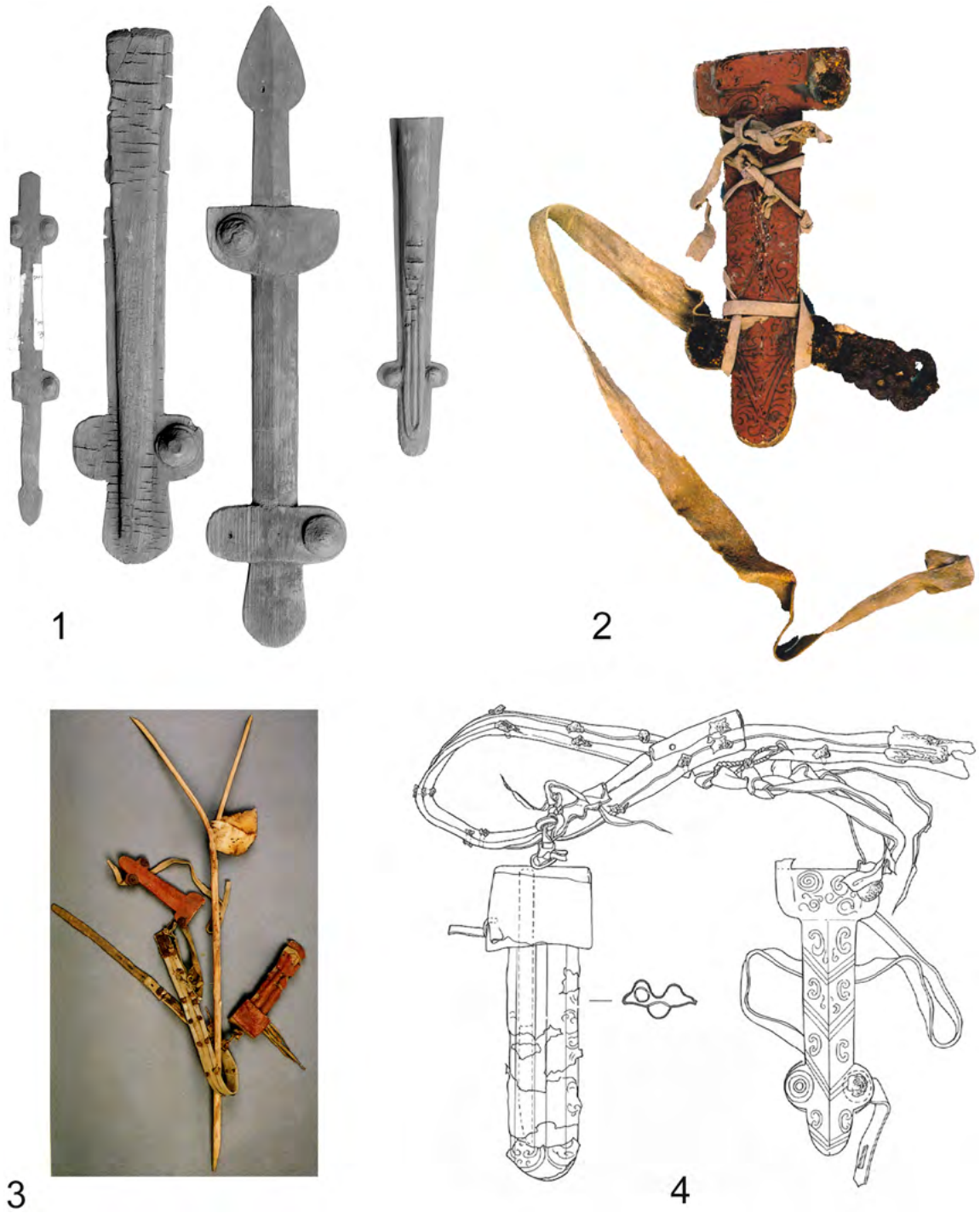

Figure 29. Models of scabbards from the Oglakhty cemetery and their parallels: 1, wooden models. L 20–39 cm, Graves 2 and 7, Oglakhty (State Historical Museum, Moscow, photograph from the SA IHMC RAS Photographic Department, neg.III 9104); 2–4, leather scabbards and details of shoulder strap from the Niya cemetery (after Zhao and Yu eds 2000: 16): 2, Niya, Grave 8 (after Zhao and Yu eds 2000: 16); 3, Niya, Grave 3 (after Zhong Ri Gongtong Niya Yiji Xueshu Kaochadui and Nitchū Kyōdō Niya Iseki Gakujutsu Chōsatai 1999); 4, Niya, Grave 3 (after Wang ed. 1999: 124)

would be as bold as to suggest that these migrants may have had traditions similar to those of the population of the oases in the Tarim Basin. The silk fragments from Oglakhty and other earthen cemeteries may have been the curated remains of silk fabrics and items sewn from them brought as personal belongings by settlers arriving in the Yenisei river valley.

Conclusions

Different ways of burying people in the same graves in the early Tashtyk cemeteries may reflect their different origins: descendants of local population and immigrants living and buried alongside each other. Research into the well-preserved clothes, footwear and headdresses

Figure 30. Mask on the head of the woman from Oglakhty, Grave 4 and the painting on the face of a woman from the Zhaghunluq cemetery, Grave 2, Xinjiang: 1, plaster mask, H 23.5 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2864/1); 2, painting on the face of a woman (after Wang ed. 1999: 80)

worn by the mummies and mannequins showed a close resemblance in the cut of their clothes, hair-styles and facial appearance. The only certain difference, apart from the funerary rite itself, is how their heads were supported, i.e. wooden blocks for mummies and leather cushions for mannequins. The exceptionally preserved finds from Grave 4 only represent a single grave and on this basis it is difficult to reach reliable conclusions. Nevertheless, it is possible to surmise that the similarity of funeral appearance of mummies and mannequins, which most likely included the life-time garments and haircuts, reflected the mixed character of these two groups resulting from co-habiting for a long period and assimilating their cultural features. Parallels existing for some special features of the Oglakhty grave materials among those in the Tarim Basin sites indicate this region as a probable area of origin for the immigrant group of the early Tashtyk population. At the same time, the parallels found among materials of an earlier period suggest a certain similarity between the cultures of Xinjiang and southern Siberia as defined by the common traditions which had existed in these regions since at least the Scythian period.

To conclude, it is essential to note that the search for parallels to artefacts made of organic materials, as well as the characteristics of funerary rituals linked with them, is always of a selective character: regions and monuments with the usual state of preservation of organic materials tend not to be examined and the selection is inevitably subjective. Nevertheless, in my opinion, the parallels between Minusinsk and Tarim materials in the early Tashtyk period should be borne in mind in further research. Future finds of preserved mummies and mannequins in Tashtyk cemeteries older than Oglakhty may identify more significant differences between them.

Textile finds from the central burials of the Arzhan-1 barrow in Tuva

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Abstract

The Arzhan-1 mound in Tuva is an elite burial complex of nomadic people of the initial Scythian period and dating to the end of the 9th or beginning of the 8th century BC. Textiles found there include fragments of polychrome woven fabrics and braided elements made of wool and these represent the earliest and largest collection of textiles from the Altai-Sayan region. The textiles from the Arzhan-1 central chamber burials are stored in the Department of Archaeology of Eastern Europe and Siberia of the State Hermitage Museum. They were analyzed in the museum's Department for Scientific Examination and Authentication of Works of Art. This paper presents descriptions and analytical results on all of the items studied from the five burials with information on the structure of the fabrics, woven samples, their constituent threads and fibre composition. The information on the identified dyes and their possible sources is also presented. Furthermore, the distinctive features of the Arzhan textiles are considered and their comparisons with finds from contemporary sites in other parts of central Asia are discussed. Special attention is paid to archaeological finds from Xinjiang (northwest China) where a significant number of textile items are preserved, many of which show similarities with those from Arzhan.

Keywords: Central Asia; Tuva; Xinjiang; Arzhan-1 barrow; early Scythian period; nomads; textiles; weaving; scientific analysis; structure; threads; fibre; dyes

Introduction

The Arzhan-1 barrow in Sayan-Altai is one of the oldest explored monuments of the early Scythian period, as well as one of the largest barrows in northern central Asia. Excavations led by Mongush Mannai-ool and Mikhail Gryaznov between 1971 and 1974 yielded items of equestrian equipment, art and weaponry which were typologically the oldest among Scythian monuments in Eurasia. This had the effect of raising the chronology of the beginning of the Scythian period by almost a century and questions of the origin and formation of Scythian-Siberian cultures examined afresh.[5] The age of the monument was confirmed both by archaeological analogies[6] and by the results of comprehensive dendrochronological and radiocarbon dating, which determined the time the complex was built in the late 9th or early 8th century BC.[7] The size of the monument, which was 120 m across before excavations began, the complexity of its construction and the burial of a large number of horses and trappings defined it as a structure of elite character where members of the highest strata of nomadic society were buried.

The monument is situated in rich winter pastures of the Uyuk valley in the Turan-Uyuk Basin (Figure 1). This so-called 'Valley of the Kings' contains a concentration of numerous chains of large barrows believed to belong to the burials of tribal and clan chieftains, including some which are of particularly imposing dimensions and take the form of stone platforms.[8] One of these was excavated and given the name Arzhan. A second similar barrow was excavated between 2001 and 2004 and as it was named Arzhan-2 the original Arzhan site became known as Arzhan-1.[9]

The above-ground structure of Arzhan-1 was a circular stone platform with a supporting wall, beneath which, at the level of the original ground surface, was a complex construction of radiating and concentric larch beams (Figure 1: 2). In the centre of this construction was a wooden chamber which contained a log cabin with the burial of a 'chieftain' surrounded by eight of his retinue and accompanied by six horses (Figure 1: 3). Around the central chamber were the burials of another

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[5] Gryaznov 1980: 51–52, 58–59.
[6] Gryaznov 1980; Marsadolov 1989*a*.
[7] Marsadolov, Zaitseva and Lebedeva 1994; Zaitseva *et al.* eds 2007.
[8] Gryaznov 1980: 3.
[9] Chugunov, Parzinger and Nagler *et al.* 2010.

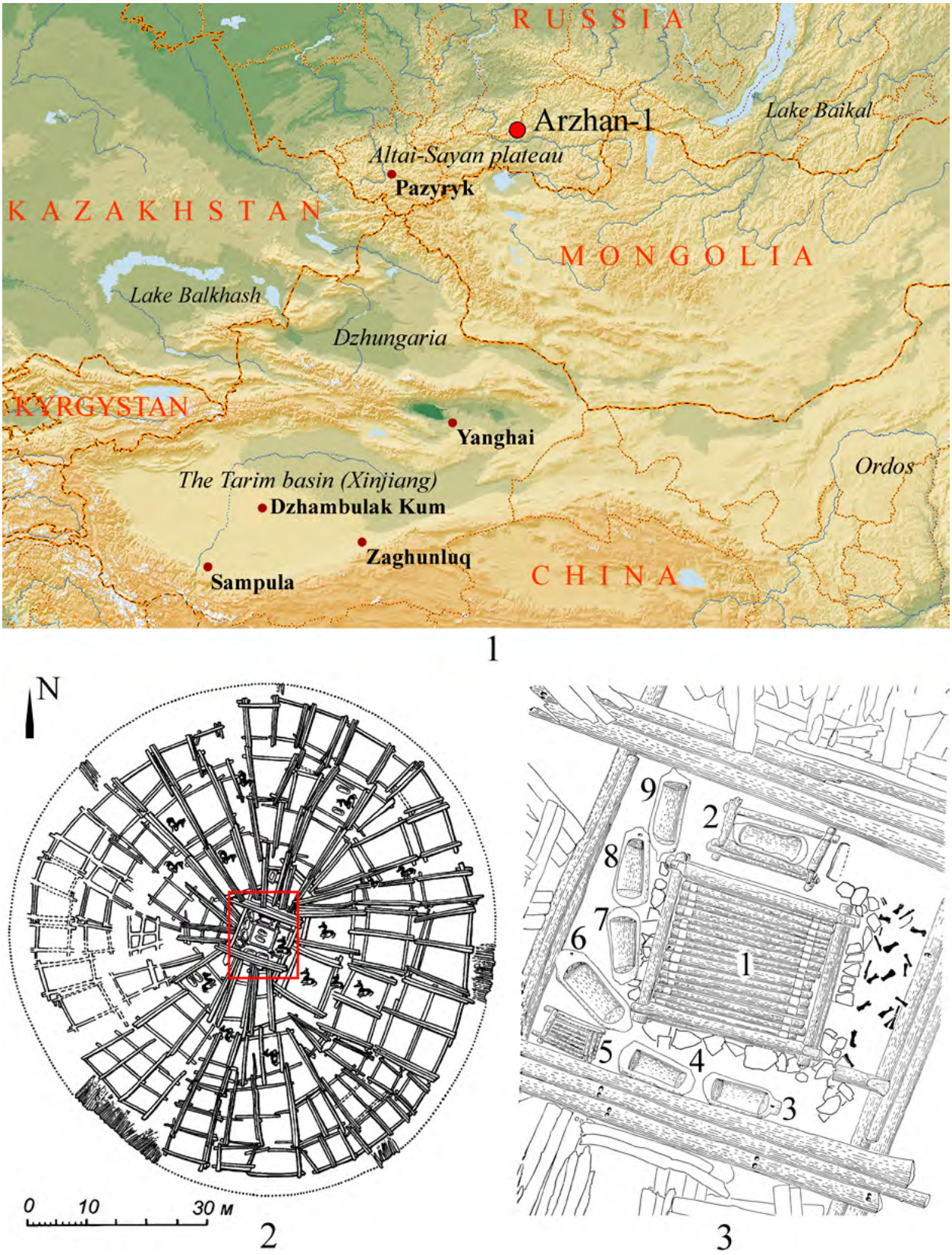

Figure 1. Arzhan-1: 1, map showing the location of the Arzhan-1 barrow in the Sayan-Altai plateau (Tuva), together with other sites mentioned in the paper; 2, plan of the wooden construction of the barrow (based on the materials of Mikhail Gryaznov, 1980); 3, the central chamber of the Arzhan-1 barrow with textile finds (after Gryaznov 1980)

seven men and about 160 horses in other cells.[10] The whole complex, especially its central part, had been extensively looted and destroyed in ancient times.

The textile finds from Arzhan-1 consist of fragments of woollen polychrome fabrics and braided details. These are the earliest and most numerous surviving textiles in the Sayan-Altai region as Bronze Age examples are rare in this area. The fact that they were found associated with an elite burial complex of horse-breeders in the early Scythian period makes it an exceptionally important source. The fabrics from Arzhan-1 were first described by Olga Plamenevskaya who published the results of a preliminary technological examination carried out with the participation of staff from the Leningrad Technological Institute of Textiles and Light Industry.[11] Further study of these materials was undertaken by Nikita Tsarev,[12] and Elena Tsareva who devoted particular attention to the fabrics made using a tapestry-weave (kilim) technique.[13] However, despite their unique status and importance, these textiles from Arzhan-1 have never been published in full and this paper offers the latest analyses.[14]

One of the main questions is where the textiles found in Arzhan-1 were made. Were they woven in the nomadic environment of Sayan-Altai or were they made in another region with more developed textile traditions? This fundamental question raises other issues of how textile production could have been organised by the mobile horse-breeders of Sayan-Altai, what contacts the nomadic elite of Tuva had in the early Scythian period and how Scythian culture as a whole was formed.[15] Considering the exclusive character of the burials at Arzhan-1 it is quite likely, although not certain, that they included imported fabrics. One of the excavation directors, Mikhail Gryaznov, thought that all the Arzhan fabrics came from a highly developed craft centre and suggested that this lay somewhere in the Near East as the ornament of rows of 'graduated pyramids' on one of the fabrics from Arzhan-1 had been common in that part of the world since very ancient times.[16] In contrast, Elena Tsareva considered the kilims from this complex to have been made by 'the people of Arzhan-1 themselves, who included ... immigrants from western territories with developed textile traditions'.[17] However, 'the technique of production and the pattern of the Arzhan-1 fabrics retained features traditional for the "pre-Siberian" period of the Saka tribes'.[18]

There is a common opinion that the supposedly simple and easily dismantled weaving devices used by nomads suggest that the capability of nomadic society to produce high-quality fabrics was limited. However, this matter requires further study. No cloth-making equipment has been found in archaeological monuments of the early Scythian period in Sayan-Altai but, rather than evidence that they did not weave, this may simply be because their placement in a grave was not considered part of the funeral ritual.[19] Virtually nothing is therefore known about the organisation of textile production in early nomadic society in the Sayan-Altai region although recent finds and studies of textiles found with burials of ordinary people in Tuva and Altai suggest such a production did exist although these finds are significantly poorer than those at Arzhan-1, both in terms of their décor and variety of techniques used.[20]

The materials from the Arzhan-1 barrow are now kept in two museums: the National Museum of the Republic of Tuva in Kyzyl and the State Hermitage Museum in St. Petersburg. The surviving textiles, which include several dozen fragments, are all in the Hermitage which acquired them in 2004. The most outstanding examples feature in the 'Ancient Siberia' permanent display. In 2017 these and some other fragments were selected for two exhibitions: *Scythians: warriors of ancient Siberia* at the British Museum and *The Hermitage Encyclopaedia of Textiles. History* in the formal rooms of the Winter Palace.[21] Immediately prior to these exhibitions the materials were studied in the State Hermitage Department for Scientific Examination and Authentication of Works of Art in order to understand the technology of production and dyes used. The preparations for the exhibitions determined the selective character of the examined textiles and limited to materials from burials in the central chamber where most of the fragments had been found. The next stage should be the examination of the textiles found in three other chambers.

The technological examination of examples of fabrics was carried out by Leica M60, Leica DM1000 and Biolam-I optical microscopes and by a Hitachi TM-3000 electronic microscope. Microchemical and morphological methods of analysis were also employed to determine the composition and structure of fabrics and threads and the identification of fragmentary wool

[10] Gryaznov 1980: 10; Marsadolov 1989*b*; Savinov 2002: 37–38.
[11] Plamenevskaya 1975: 199.
[12] Tsarev 1998; Marsadolov and Tsarev 2000.
[13] Tsareva 2010.
[14] Marsadolov *et al.* 2017.
[15] Savinov 2002: 40–50, 59–69; Chugunov 2009.
[16] Gryaznov 1980: 25.
[17] Tsareva 2010: 576.
[18] Tsareva 2010: 571.
[19] Shulga 2010: 127–31.
[20] Busova 2017; Kiryushin and Tishkin 1997: 105–107, fig. 10:8.
[21] The catalogue *Scythians: warriors of ancient Siberia* was published to accompany the first exhibition (Simpson and Pankova eds 2017) but unfortunately the catalogue of the exhibition in the State Hermitage Museum remains unpublished.

fibres. Microphotographic documentation was also used for individual elements of the objects.

Textile finds in the context of the burials

In a large wooden chamber measuring 8 x 8 m across and constructed in the centre of the barrow was a small double log cabin with the burial of the most important man, who is conventionally called a 'chieftain' or 'king'. Around it and along three walls of the large chamber were six wooden coffins (Graves 3, 4 and 6–9) and two small log cabins: Graves 2 and 5 (Figure 1: 3). Along the fourth wall were the remains of six horses.[22] All of these burials, with the exception of Grave 4, had been looted in antiquity. Fragments of fur were found in each, as well as the remains of textiles in Graves 1, 2, 4, 8 and 9. The textiles from Grave 9 did not enter the Hermitage collection and are presumed lost but their description is quoted from previous publications and archives in order to provide a complete picture.

Grave 1

The central burial of the barrow, the grave of the 'chieftain', had been entirely looted and destroyed. Fragments thought to belong to two coffins remained in a framework with double walls and a wooden floor but all that remained of the deceased were four toe phalanges on which basis 'it can be proposed with a certain degree of probability that these are the remains of an elderly man and an adult woman'.[23] Lying on the floor in total disarray were the remains of fur, possibly sable,[24] small adornments of gold leaf and turquoise, and fragments of woollen items.[25]

Fragment 1: fragment of a thick fabric with plaited braid stitched on two edges. Their dimensions are: textile 8 x 20 cm, braid 2–2.5 x 14 cm; 2–2.5 x 28 cm[26] (Fig. 2: 1-3)

The main fragment has a pattern in the form of slanting latticework with gaps in the shape of rhombi formed by weft threads of three colours: light brown, dark brown and cocoa (Table 1).[27] The braids intersect at the corner of the main fragment and go beyond its edges. The fragment is backed by a gauze fabric, which complicates examination but it can be seen that the main fragment has no selvedge and the braids overlap. On the obverse side the places where the braid joins the main fabric are covered with a cord consisting of five twisted threads similar to those on the weft and the braid: three light brown and two dark-brown threads (Figure 2: 3).

The weaving of the main fragment is unusual and deserves special attention. Olga Plamenevskaya, who worked with the fragment in 1970s before it was backed by gauze, described it as follows:

> 'On a cursory examination of the outer and inner sides of the fabric its pattern looks like a 'herringbone' design running perpendicularly to the warp. Examination of the rapport showed that ... two weft threads were used simultaneously for different purposes. Each outer weft thread only covers two of the warp threads and is not interlaced with them, whereas each inner thread passes through a loop made by the outer weft and also only catches it [but do not interlace with the warp threads until the change of colour is necessary – SP] (Figure 2: 2). The rhythmical rhombic pattern is formed by different-coloured wefts passing from the obverse to the reverse side. The warp thread and one weft thread are the colour of light umber, while the other weft is burnt umber. On one part of the fabric the light umber weft thread is replaced by a dark-brown one'. [28]

This interweaving, if the description is correct, can be termed a type of patterned twining or more precisely of two-strand weft-twining.[29] When examining the fragment in 2017 it was not possible to find the second weft as the reverse side is no longer accessible and the poor state of preservation of the threads and their friability do not permit a more intensive intrusion into the woven fabric to study it. Thus Elena Mikolaychuk supposedly defined the interweaving on the fragment as twill 1:2.[30]

Carol James, an expert on sprang from Winnipeg (Canada), who studied the fragment in a Hermitage display case, followed by examination of photographs, remarked that its structure is very similar to a New Zealand weaving technique known as *taniko*, used there mainly for narrow decorated bands.[31] Carol has made several pieces of *taniko* during her journey to New Zealand in 2016 together with a weaving instructor at the National Weaving School at New Zealand Maori Arts and Crafts Institute in Rotorua. She finds the appearance of Arzhan-1 fragment and its description by O. Plamenevskaya very consistent with *taniko*.[32]

In the fragment under consideration the wefts are twisted in different (right or left) directions

[22] Gryaznov 1980: 15–25.
[23] Gryaznov 1980: 20.
[24] There is no indication in the publication why remains of the fur in Arzhan-1 graves were suggested by Gryaznov to probably be sable.
[25] Gryaznov 1980: 20.
[26] Dimensions of the fragments are given here and subsequently initially for the warp, then for the weft (height/width).
[27] Information about the gaps between the threads and the resulting density of the fabrics not included in this table was given in a previous publication (Marsadolov *et al.* 2017).
[28] Plamenevskaya 1975: 200.
[29] Emery 1994: 203.
[30] Marsadolov *et al.* 2017: 125.
[31] Mead 1952.
[32] Carol James, pers. comm. 2019.

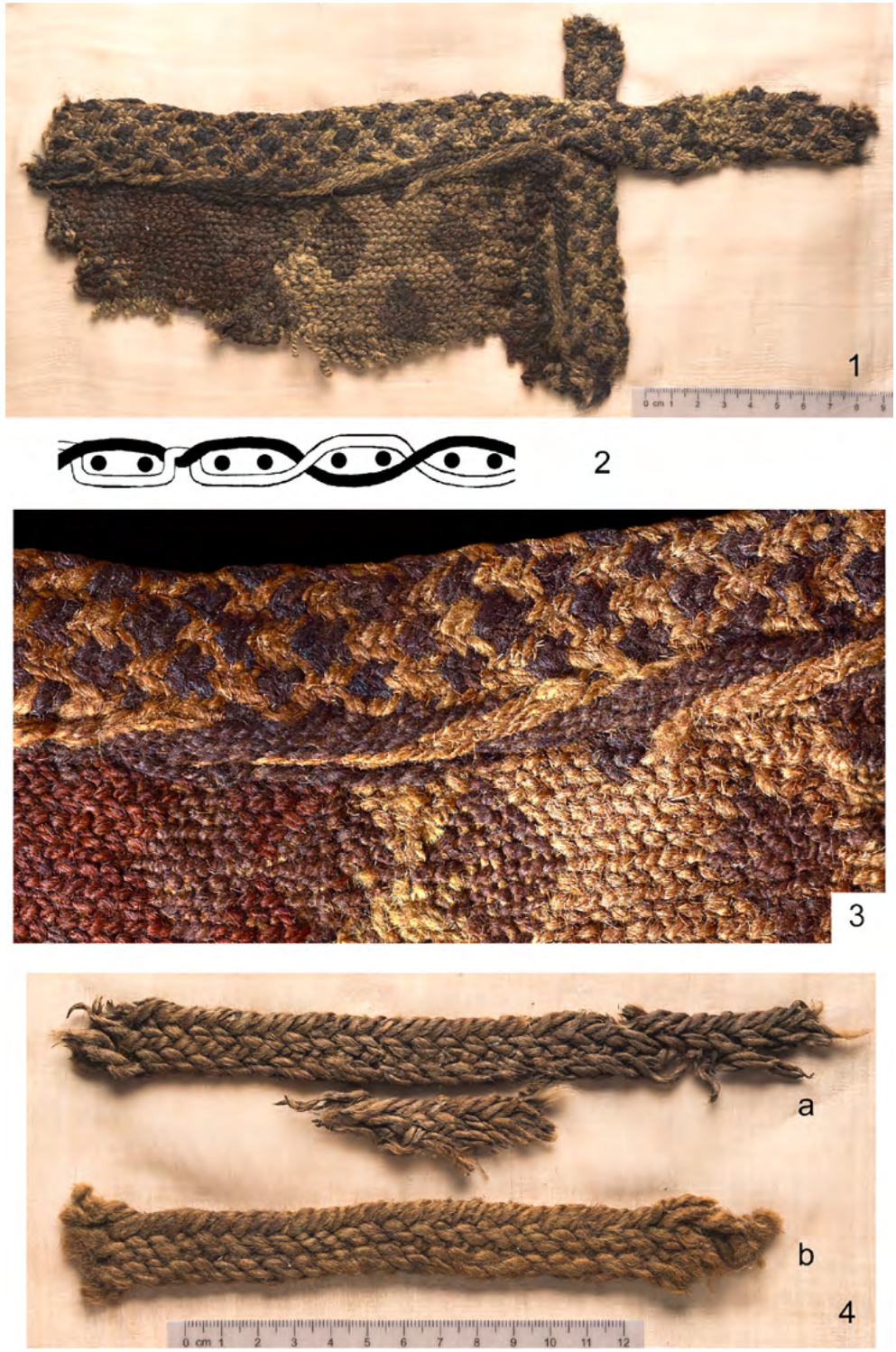

Figure 2. Fragments of textile objects, Arzhan-1, Grave 1. Wool. 1: piece of a thick fabric bordered with braided tapes, 14 x 28 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/155); 2, weaving diagram of the fabric (after Plamenevskaya 1975); 3, detail: braided tape and a cord at the junction of the braid and the fabric; 4, fragments of braided straps: a – 1.8 x 23 cm; b – 2.0 x 20 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/167–168)

each second pick, thus creating a herringbone appearance. Judging by the area of dark rhombus (where light warp threads are visible behind dark wefts) the step of the weft (that covers two warps) is shifted every pick to one warp thread, giving another reason why the textile has a twill like appearance. Generally speaking, *taniko* is a special case of weft twining structures,[33] and identification by James therefore confirms use of this special technique in this Arzhan-1 textile.

The woven braid, 2–2.5 cm in width with a checked pattern, is made with the same threads as the light brown and dark brown wefts. The braid was made in twill oblique interlacing technique but special work was undertaken by Carol James to recognise a certain pattern of interlacing and arranging colors. She has drawn a track plan, a diagram showing the movement

[33] Emery 1994: 200–205.

Figure 3. Replicating the braid of fragment: 1, Distribution of threads of two colours before braiding; 2, modern replica of the braid (photographs by C. James); 3, braid of fragment 1

of the thread throughout, and using the track plan she tried several ways to reproduce the braid.[34] One of them led finally to a success providing a replica of the ancient braid (Figure 3: 2-3). Twelve light and eight dark threads are used in this braid. Their pattern/distribution at the start is an alternation (from right to left) of two dark and three light threads (Figure 3: 1). One should follow over 2, under 3 pattern for threads going right-to-left. Correspondently the threads that run left-to-right follow an over 3, under 2 pattern.[35]

This fragment differs from the other textile finds from Arzhan-1 in the substantial thickness of the fabric. The same threads were used to make the fabric and the braided tapes (Table 1), which suggests that these parts were made and joined together in the same household or workshop.

Fragments 2–3: fragments of a fabric item with a 'graduated figure' pattern. Two fragments of fabric survive: a corner piece of 13 x 9 cm with one decoratively reinforced edge, one hemmed edge and braid stitched to the corner, and a central piece of 8.5 x 11.8 cm (Figure 4: 1–3)

The pattern on the fabric is of linked graduated figures in contrasting colours facing upwards and downwards. The fabric was made in the weft-faced tabby technique when different thickness and density of the warp and weft threads creates a so-called rep effect – parallel relief ribs on both sides of the fabric. The double-sided pattern was produced in the tapestry weave (kilim) technique: weft threads of different colours are not stretched from one edge of the width to the other but fill only specific parts, thus forming the decor. The joining of the wefts on the vertical (along the warp threads) is done in the following way: two weft threads of different colours meet one another in an interlacing with the warp threads. Each of these weft threads is bent around its last warp thread according to the pattern of the fabric. This last warp thread is common to both weft threads. In the process these weft threads are simultaneously joined together in the form of a loop. Each thread then goes in the opposite direction, like an ordinary weft. This type of 'join' can be described, according to Irene Emery's classification, as 'interlocking round a common warp'.[36] Because of the varying thickness of the weft threads of different colours the density of the fabric differs in various places (Table 1).

[34] An idea of track plans was first published by Noémi Speiser (1983), and was advised to Carol by John Whitley, a specialist in the area of Japanese braids.

[35] We are sincerely grateful to Carol James for her deep interest in Arzhan-1 textiles and for creating samples to achieve exact replicas of Arzhan originals.

[36] Emery 1994: 80.

No. of article	Grave, Article, Inv. No.	Item	Weave	Warp: Thread count per cm.	Weft: Thread count per cm.	Warp: Colour, structure, thickness (mm)	Weft(s): Colour, structure, thickness (mm)	Warp: Fineness of fibres (micro-metres)	Weft: Fineness of fibres (micro-metres)
1.	**Grave 1** Fragment of thick fabric with a woven braid stitched along two edges Inv. No. 2878/155 Fig. 2: 1–3	Fabric	Patterned weft twining (2 wefts) with paired warps	4	4	Light-brown z2S[1*] 1.8–2.5	Light-brown, dark-brown, cocoa z2S 2.3–2.8	15–90	15–90
		Woven braid	Twill oblique interlacing			Light-brown, dark-brown z2S 2.3–2.8		No data	
		Cord on join between braid and fabric				Twist of 5 threads		No data	
2-3.	Fragments of an article of fabric with a ‘graduated figures’ pattern Inv. No.2878/163 (1-2) Fig. 4: 1–3	Fabric	Tapestry weave with interlocking round a common warp	12	72–80	Brown Z 0.5–0.6	Red, claret, yellow Z 0.25–0.35 Green, brown Z 0.15–0.25	15–32, single up to 75	12–30
		Thread of decorative hem				Red, green Z 0.4–0.5 Taken up in three folds		12–30, single up to 90	
		Braid on corner of fabric (fr. 1)	Braiding			Claret, green z2S 1.0		15–30	
4.	Fragment of braid Inv. No. 2878/164-1 Fig. 4: 5	Braid (fr. 2)	Plain oblique interlacing			Claret, green z2S 0.75–1.0		15–32, single up to 60–90	
5.	Fragment of braid Inv. No. 2878/164-2 Fig. 4: 4	Braid (fr. 3)	Braiding			Claret, green z2S 0.75–1.0		15–30	
6.	Fragment of fabric with pattern in the form of lens-shaped figures (‘leaves’) Inv. No. 2878/162-1 Fig. 4: 6	Fragment 1	Tapestry weave with slits and dovetailing	12–14	Blue pattern: 84 Yellow background: 52–72	Dark-yellow Z 0.4	Dark-yellow, blue Z Blue: 0.2–0.25 Yellow: 0.25–0.4	9–30	9–15 (down)

[*] Such a record implies S-plied thread from two z-twisted yarns.

Table 1. Technological characteristics of fabrics, braidings, threads and fibres

No. of article	Grave, Article, Inv. No.	Item	Weave	Warp: Thread count per cm.	Weft: Thread count per cm.	Warp: Colour, structure, thickness (mm)	Weft(s): Colour, structure, thickness (mm)	Warp: Fineness of fibres (micro-metres)	Weft: Fineness of fibres (micro-metres)
7.	Fragment of fabric with pattern in the form of lens-shaped figures ('leaves') Inv. No. 2878/162-2 Fig. 4: 7	Fragment 2	Tapestry weave with slits and dovetailing	12–14	Blue pattern: 64 Yellow background: 64–72	Dark-yellow Z 0.4	Dark yellow, blue Z Blue: 0.3–0.4 Yellow background: 0.25–0.4	9–30	9–15 (down)
8.	Fragment of braid Inv. No. 2878/167 Fig. 2: 4a		Braiding			Brown Z 2.0–3.0		18–75	
9.	Fragment of braid Inv. No. 2878/168 Fig. 2: 4b		Braiding			Light-brown Z 2.0–4.0		18–75	
10.	**Grave 2** Fragment of thin fabric with decorative border and braid Inv. No. 2878/158 Fig. 5	Main fabric	Weft faced tabby	18	72	Light-brown Z 0.35–0.45	Blue Z 0.15–0.25	18–36	12–24 (down)
		Decorative border	Patterned weft twining (2 wefts) with paired warps	18	16		Sandy z2S 1.5 Blue z2S 2.0		18–27 (down)
		Braid along the edge of the fabric	Braiding			Blue, sandy z2S 0.35–0.50		18–27	
		Thread used to stitch the braid to the fabric				Light-brown z2S 1.5–2.0		18–36	
		Fabric stitched from the reverse side	Tabby	18	36	Light-brown Z 0.35–0.45		18–36	
		Cord on the join between the main fabric and the braid				Twist of 5 threads		No data	

Table 1. Continued

No. of article	Grave, Article, Inv. No.	Item	Weave	Warp: Thread count per cm.	Weft: Thread count per cm.	Warp: Colour, structure, thickness (mm)	Weft(s): Colour, structure, thickness (mm)	Warp: Fineness of fibres (micro-metres)	Weft: Fineness of fibres (micro-metres)
11.	**Grave 4** Corner of an article of thin striped fabric with two processed edges and a corner strap Inv. No. 2878/161 Fig. 6	Fabric	Twill 2:2	32	32	Red, blue, light-brown, dark-brown, yellow, green Z 0.35	Blue Z 0.35	12–24 (down)	12–24 (down)
		Thread of cylinder hem				Auburn Z 0.4–0.5 Taken up in three folds		12–30, single up to 75	
		‘Herringbone’ hem thread				Light-brown, blue Z 0.4–0.5		15–90	
		‘Herringbone’ hem thread (ancient repair)				Light-brown, blue Z ≈0.1 Taken up in three folds		No data	
		Corner strap, fabric	Twill 1:2	10	32	Dark-brown Z 0.5	Red, blue, light-brown z2S 0.5	13–35, single up to 83	14–32
		Hem of corner strap				Auburn Z 0.4–0.5 Taken up in three folds		12–30, single up to 75	
12.	Fragment of an article of two fragments of thin striped fabric with hemmed edges stitched together Inv. No. 2878/166 Fig. 7	Fabric	Twill 2:2	34	34	Red, blue, light brown, dark brown, yellow, green Z 0.2–0.3	Blue Z 0.2–0.3	12–30	18–30, single up to 60
		Cylinder hem thread				Auburn Z 0.3–0.5 Taken up in four folds		12–75 (predominate up to 50)	

Table 1. Continued

No. of article	Grave, Article, Inv. No.	Item	Weave	Warp: Thread count per cm.	Weft: Thread count per cm.	Warp: Colour, structure, thickness (mm)	Weft(s): Colour, structure, thickness (mm)	Warp: Fineness of fibres (micro-metres)	Weft: Fineness of fibres (micro-metres)
		Thread of the decorative hem				Light-brown Z 0.3–0.5 Taken up in four folds		15–90 (predominate up to 50)	
13.	Fragment of two pieces of thin striped fabric stitched together Inv. No. 2878/156-1 Fig. 8	Fabric	Twill 2:2	34	34	Red, blue, light-brown, dark-brown, yellow, green Z 0.2–0.3	Blue Z 0.2–0.3	12–30	18–30 single up to 60
		Joining thread				z2S		No data	
14-15.	Fragments of striped fabric with polychrome warp threads and a border Inv. No. 2878/156-2 Fig. 9	Fabric (two fragments)	Weft-faced tabby with paired warps	12	30	Blue, red, dark-brown, light-brown Z 0.5	Blue, red, dark-brown Z 0.5–0.6 Light-brown z2S 0.75	15–87	15–87
		Thread of the cylinder hem				Auburn Z 0.3–0.5 Taken up in four folds		12–75	
16.	**Grave 8** Fragment of an article with seams and ‘embroidery’ Inv. No. 2878/170 Fig. 10: 1–4	Fabric	Weft faced tabby	8	50	Sandy Z 0.6	Light-brown Z 0.25–0.35	15–96	12–27 (down)
		Thread of decorative seam				Blue Z 1.0 Taken up in three folds		12–27 (down), single up to 75	

Table 1. Continued

No. of article	Grave, Article, Inv. No.	Item	Weave	Warp: Thread count per cm.	Weft: Thread count per cm.	Warp: Colour, structure, thickness (mm)	Weft(s): Colour, structure, thickness (mm)	Warp: Fineness of fibres (micro-metres)	Weft: Fineness of fibres (micro-metres)
17.	**Grave 9** Fragment of an article with bordered edges and a corner strap, fragments of straps Not in the Hermitage collection Fig. 10: 5	Fabric	Weft faced tabby	No data (Photographs from Mikhail Gryaznov's archive)					

Table 1. Continued

The top edge of the item is folded over on to the reverse side and stitched. The side edge is, according to E. Tsareva's determination, reinforced by a strip of twining and an additional cord,[37] but this could not be confirmed as it is now stitched tightly onto a backing. Along this edge there is an embroidered pattern of triangular festoons formed by parallel stitches of various lengths (Figure 4: 2). The colour of the festoons matches the colour of corresponding areas of twining band, and both contrast with the graduated figures of the main tapestry fabric.

A braid of claret and green threads with a rounded end is stitched to the corner although only a small fragment survives (Figure 4: 2). The threads of the braid and the border are the same colour as the wefts of the fabric (red, claret and green) and were apparently made from the same raw material (Table 1). This makes it possible to suppose that all the details were made in a single workshop where they were woven, plaited and joined together to make the finished article.

Fragments 4–5: two fragments of braid from claret and green threads. Their dimensions are: 6.5 x 2–2.6 cm, 4.5 x 2 cm (Figure 4: 4–5).

The fragments are similar to the braid on the corner of the fabric with 'graduate figures'. They are all of similar width and made with the same threads (Table 1), although they differ somewhat in construction. It is not possible to count the threads or precisely define the method of weaving on the stitched corner fragment with the dense weaving. Fragment 4 (Figure 4: 5) is made by plain oblique interlacing of 11–12 claret and 11–12 green threads (according to Tatiana Kuznetsova, to whom we are very grateful for this identification). Fragment 5 (Figure 4: 4) is of 14 claret and 14 green threads and is more similar to a thin strap stitched to the corner of the fabric. It is very probable that it and fragment 5 previously formed a single strap; fragment 4 may have been stitched to another corner (?) of the same item which has not survived.

Fragments 6–7: two fragments of tapestry weave with a pattern in the form of blue lens-shaped figures ('leaves') on a dark yellow background. Their dimensions are: about 6.5 x 9.6 cm and 6.3 x 5.5 cm (Figure 4: 6–7)

The fabric has become deformed and the blue threads have faded, so the pattern can only be vaguely reconstructed: horizontal rhomboid leaf-shaped figures of various sizes and outlines, arranged in a staggered manner. Another fragment of this fabric has been published by Elena Tsareva.[38]

[37] Tsareva 2010: 574, table 2.
[38] Tsareva 2010: 572–73, table 1, coloured inset, fig. 5.

Figure 4. Fragments of woollen textile from Arzhan-1, Grave 1: 1, fragment of an edged fabric with a graduated pattern and a strap, 13 x 9 cm; 2, detail; 3, fragment of the same fabric 8.5 x 11.8 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/163 (1, 2); 4–5, fragments of braided straps 6.5 x 2.6 cm; 4.5 x 2 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/164); 6–7, fragments of tapestry fabric with a pattern in the form of 'leaves' 6.5 x 9.6 cm; 6.3 x 5.5 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/162).

The pattern is created by the weft threads: on the border of its colour ground the weft thread folds around the last warp thread according to the pattern and turns back, so in a number of cases there are small slits on the borders of the colours. Sharp angles of the figures are formed by a so-called dovetailing method as the wefts

from adjacent areas turn back alternately round the warp which is their common boundary.[39]

Fragments 8–9: fragments of braided straps with identical weaving and slightly differing in width and colour: the darker one is 1.8 cm across and the lighter one 2 cm.

Both braids are woven from identical thick single Z-twisted threads (Table 1). Their lengths are 20 and 23 cm (Figure 2.4).

Grave 2

This was a log cabin containing a wooden coffin (Figure 1.3). Over half of the bottom of the coffin were the remains of fur. Among, as well as beneath, the hair were small gold ornaments in the form of rectangular appliques and a large number of coiled beads, a large number of turquoise micro-beads and small fragments of woollen fabric. No remains of the buried person were found and may have been removed by looters.[40]

Fragment 10: fragment of thin weft-faced fabric with decorative border and braid. 12.5 x 11 cm (Figure 5.1)

A border decorated by rhombi is a continuation of the main fabric, i.e. both parts are made with common warp threads, while the pattern is obtained by the introduction of considerably thicker coloured wefts and a change in the interlacing (Figure 5.2). The pattern of the border changes on one edge but here it is unclear because of a tear in the cloth.

Double weft threads were used to create the border. In the patterned part they are of two different colours: dark blue and sandy. Each blue (obverse) weft thread covers two warp threads without interlacing with them, while each sandy (reverse) weft thread intersects with a blue thread through the same two warp threads, catching it. The pattern is formed when the weft threads change places: the sandy threads pass from the reverse to obverse sides (Figure 2.2). The blue threads are substantially thicker than the sandy ones, so on the reverse side they cover the sandy threads and the expected mirror pattern does not materialise. In Olga Plamenevskaya's opinion, the border with rhombi was made using the same technique as the thick fabric from Grave 1 (Figure 2.2).[41] However, in this case two wefts are twining constantly in one and the same direction so all the 'stitches' look parallel (not like herringbone as on Fragment 1), so this is slightly different type of patterned weft twining. For the stripes on the edge of the border with the rhombi (four sandy and two blue) double wefts of the same colour were used, so that the stripes look identical on both sides. The threads of the weft also pass through two warp threads: with plain weave on the stripes on the edge and between the rhombi, and with twill weave on the sections with rhombi.

The blue-yellow braid stitched to the top of the fabric is similar in appearance to a tablet-woven item. However, those items always have a weft thread which was not found on our braid. This braid was therefore most probably made by some other technique. The braid is stitched to the main fabric with light brown thread which can easily be seen on the reverse side (Figure 5.3). The seam joining the braid to the main fabric is hidden on the obverse by a tightly twisted plait of five dark blue threads (Figure 5.2).

A double strip of brown plain weave fabric is stitched to the upper part of the border on the reverse side (Figure 5.3). It covers the top of the base fabric as far as the join with the braid. The warps and wefts of this brown fabric have the same characteristics as the warp threads in the main fabric. The characteristics of the fibre are also similar in various details (Table 1). It is likely that the details of this fabric were also made and assembled in the same household or workshop.

Grave 4

This contained a coffin with the burial of a man aged 18–20 placed on his left side in a contorted position. He had a copper alloy dagger in a leather sheath at his waist, and 12 copper alloy and 26 bone arrowheads beside his feet. Below his left temple was a gold earring with turquoise inlays and a pendant bead. There were numerous remains of fur (sable?) clothing and fragments of a garment made from striped woollen fabric in four colours.[42] This was the only grave which had not been looted. On the plan of the grave all the above-mentioned organic material (both fur and fabrics) is shown covering the entire bottom of the coffin and below the skeleton of the deceased.[43] Mikhail Gryaznov's reference to fragments of clothing here and elsewhere was most probably just a convention as there is no indication that these fragments were actually clothing.

Fragment 11: the corner of an item of twill striped fabric with two trimmed edges and a corner strap. Fragment: 20 x 13 cm; corner strap 5.5 x 1.5 cm (Figure 6.1–2)

One edge has a decorative hem and the other is folded over. A strap of a different material is stitched diagonally to the corner where the hems meet and the end of the strap has been torn off. The fabric is twill

[39] Emery 1994: 80.
[40] Gryaznov 1980: 21, fig. 11, 5, 7; 10, 8.
[41] Plamenevskaya 1975: 203–204.
[42] Gryaznov 1980: 21, figs 8, 11.1–2, 10–13, 9.2.
[43] Gryaznov 1980: 21, fig. 8.4.

Figure 5. Fragment of woollen fabric with ornamental border from Arzhan-1, Grave 2., 12.5 x 11 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/158): 1, general view; 2, detail; 3, reverse

2:2 with a pattern of stripes of different colours. Each of the broad stripes consists of several narrow stripes which were symmetrically but differently arranged within the broad stripes. The latter are woven on to the background which consists of broad alternating sections of blue and sandy colours. The fabric is very faded and discoloured in places and some of the blue threads of the background have partly lost their colour. On this fragment there is a full multi-coloured stripe on the blue background and three stripes on the sandy background: two identical ones on the sides and a different one in the centre (Figure 6.3).

On a fragment of balanced twill without selvage, with identical density and fibre composition of the warp and weft (Table 1), it is very difficult to identify each system. The fabric is very full and without destroying the integrity of the piece it is difficult to calculate the density and degree of twisting of the warp and weft threads in order to compare them. By analogy with most

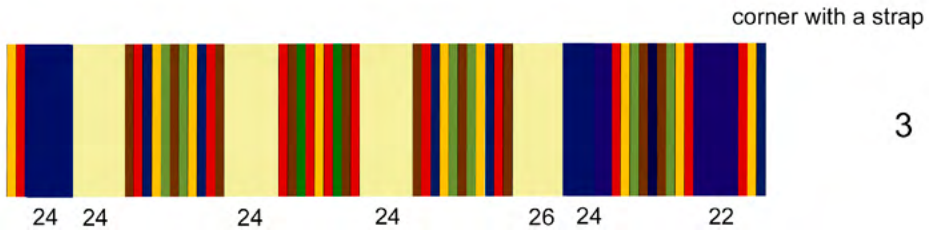

Figure 6. Corner of woollen article of thin twill fabric with bordered sides and corner strap from Arzhan-1, Grave 4, fabric 20 x 13 cm; corner strap 5.5 x 1.5 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/161): 1, general view; 2, detail; 3, diagram of colourful striped pattern. Each narrow stripe contains 4 warp ends. Numbers at the areas of background are numbers of warp ends (diagram by S. Pankova)

of the other fabrics from Arzhan-1 where the patterns are formed by weft threads, we have first assumed that here too the stripes were formed by the weft threads.[44] However, another opinion was expressed by Dr Nicole Reifarth (Eberhard Karls Universität Tübingen) who studied a similar striped fragment 7 (Figure 8) during the course of preparation for the Scythian exhibition at the British Museum: she noted a looser twisting of the threads which we had interpreted as warps by comparison with the threads of different colours, and suggested that the more tightly twisted threads of different colours should instead be considered as warp threads.

The correct identification of the warps and wefts is particularly important in this case as it would help resolve the fundamental question as to the method of forming the pattern: i.e. with warp or weft threads? Weft patterns are characteristic of weft-faced fabrics which were widely used by the pastoralist population

[44] Marsadolov *et al.* 2017: 129.

of central Asia. On the other hand, fabrics with stripes formed by warp threads were common among textiles from the Tarim Basin, as it is now known from the recently published large group of textile objects from Zaghunluq cemetery.[45] Following Dr Reifarth's observations we now find it highly likely that the stripes of all Arzhan-1 twill fabrics were made by warp threads (Table 1).

One edge of this striped fragment (Figure 6) is folded 5 mm onto the obverse and stitched with a tight decorative seam which forms a 3 mm-wide cylinder of auburn thread folded in three as three identical threads pass through the same needle hole. Along the other edge of the fragment is an extra thick thread or cord of sandy colour which is completely concealed by the hem thread. The latter thread makes alternate stitches around the edge of the fabric and cord, consequently the hem has the appearance of a herringbone design supplemented by regular triangular festoons each formed by three long stitches. The hem is made with alternating light brown and blue threads but in one section the thick light brown thread is replaced by a thin one of similar colour folded in three, probably the result of ancient repair.

The strap stitched to the corner is made of fabric of the same colours but with a different pattern and interlacing. The sides of the strap are frayed so it is unclear whether they were processed. The fabric is full and durable, twill 1:2, and its obverse and reverse sides are similar. The end of the strap is bordered on three sides by a decorative cylindrical seam which is simultaneously the seam attaching the strap to the corner of the fabric. On the fourth side, across the strap, is a small cord in the same triple bright auburn thread but attached only to the corners of the rectangle which has been formed. The thread of the strap's hem is the same as that on the hem of the upper edge of the fabric (Table 1). The cylinders are made in the same way but the cylinder on the strap is looser; it is 4–5 mm wide.

Fragment 12: a fragment of an article of two stitched fragments of twill striped fabric with hemmed edges. 16 x 15.5 cm (Figure 7)

The striped fabric – twill 2:2, has blue weft threads and warp threads of light brown, red, dark brown and blue etc. The fabric is discoloured: the blue threads have either faded or darkened the adjacent sandy threads. The reverse side is inaccessible as the fabric has a modern backing, thus the method of joining the fragments is unclear. On the obverse the join is covered by a decorative seam forming a round cylinder of a bright auburn colour. The top edge of the large fragment is tucked into the obverse side and stitched, and the resulting joint 'masked' by a similar cylindrical seam. In both cases an auburn thread folded in four was used.

The edge of the second, smaller fragment was worked in a different way: it is neatly folded on the obverse side and hemmed by a cylindrical seam and triangular festoons with parallel stitches. The light brown thread used for this is folded in four. At the place where the fragments join the edge of the fabric are the remains of a border in the form of a loop of the same auburn cylinder as the hem of the large fragment and similar to the hem of the corner strap of the previous fragment (Figure 7: 2).

The pattern on fragment 12 is again of stripes of different colours on a background consisting of broad alternating sections of blue and sandy colours. The stripes on the sandy-coloured section of the background are the same as those on the sandy-coloured section of the pattern on fragment 11 (Figure 7.3).

Fragment 13: a fragment of two pieces of striped twill fabric stitched together. 33 x 20 cm (Figure 8)

Two fragments of thin fabric of twill weave 2:2 are stitched together across the stripes and the stripes do not join as they are shifted by two stripes (Figure 8.1–2). The two fragments are tucked in along the complete length of the seam on the reverse side: the fold of one is 3–4 cm, the uneven edge has been torn off. In comparison with the neat working of the edges of other textiles from Arzhan-1 and the tradition of covering the seams with a decorative hem or cord, this seam looks quite carelessly done but it is possible that what we have here is the back of an article.

The patterns preserved on these two fragments (13A, 13B) give an impression about the whole pattern of a width: four alternating multi-coloured stripes of two kinds on the blue section of the background (which is 9.7 cm width) and three multi-coloured stripes on the sandy background (7.5 cm width): two identical stripes on the edges and a different one in the centre (Figure 8.3–4). Each narrow stripe within wide ones contains 4 warp ends. Spans between multi-coloured stripes are mainly of 24 or 26 threads with exceptions on 13B fragment only.

A general view of the pattern of fragments 11–13 – the type and sequence of the stripes – looks very similar. The fabrics of the three fragments (11, 12, 13A) have been additionally examined to establish whether they are identical. The technological characteristics of examples 12 and 13A (Figures 7, 8.1a) completely coincide, i.e. the pieces are fragments of the same large

[45] Wang Bo 2016: 129, no. 1, 155, no. 10, 193, no. 19, 195, no. 20, 201, no. 22, 213, no. 26, 223, no. 30, 235–36, no. 34.

Figure 7. Fragment of article of two fragments of twill striped fabric stitched together with hemmed edges. Arzhan-1, Grave 4. Wool. 16 x 15.5 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/166): 1, general view; 2, detail; 3, diagram of colourful striped pattern

fabric. The fabric of the corner fragment 11 (Figure 6) is similar but differs slightly from the other two (Table 1), so it may have belonged to another width.

Fragments of another striped fabric, similar by colours but totally different in type and thickness (Fr. 14–15) may have belonged to the same item: according to Olga Plamenevskaya, one was stitched with a hem seam with a striped twill fabric.[46]

Fragments 14–15: two fragments of weft-faced striped fabric. 6 x 5.5 cm; 5 x 4.5 cm (with border) (Figure 9)

Fragments of weft-faced weave with paired warps. There are stripes of auburn-red, dark brown, light brown and blue formed by the weft on a blue background. The warp threads are the same colour, although on the existing fragments they are completely invisible under the weft threads which cover them (Figure 9.3). The interlacing most probably changed on other (non-extant) parts of the fabric and the warps came out on to the surface and created the pattern. The method of alternating the weave to create the pattern (also with paired warps) has already been noted on the fragment from Grave 2 (Figure 5). It is also possible that colourful warp threads might be used for creating a fringe. The edge of one fragment is hemmed with a seam of bright auburn

[46] Plamenevskaya 1975: 204.

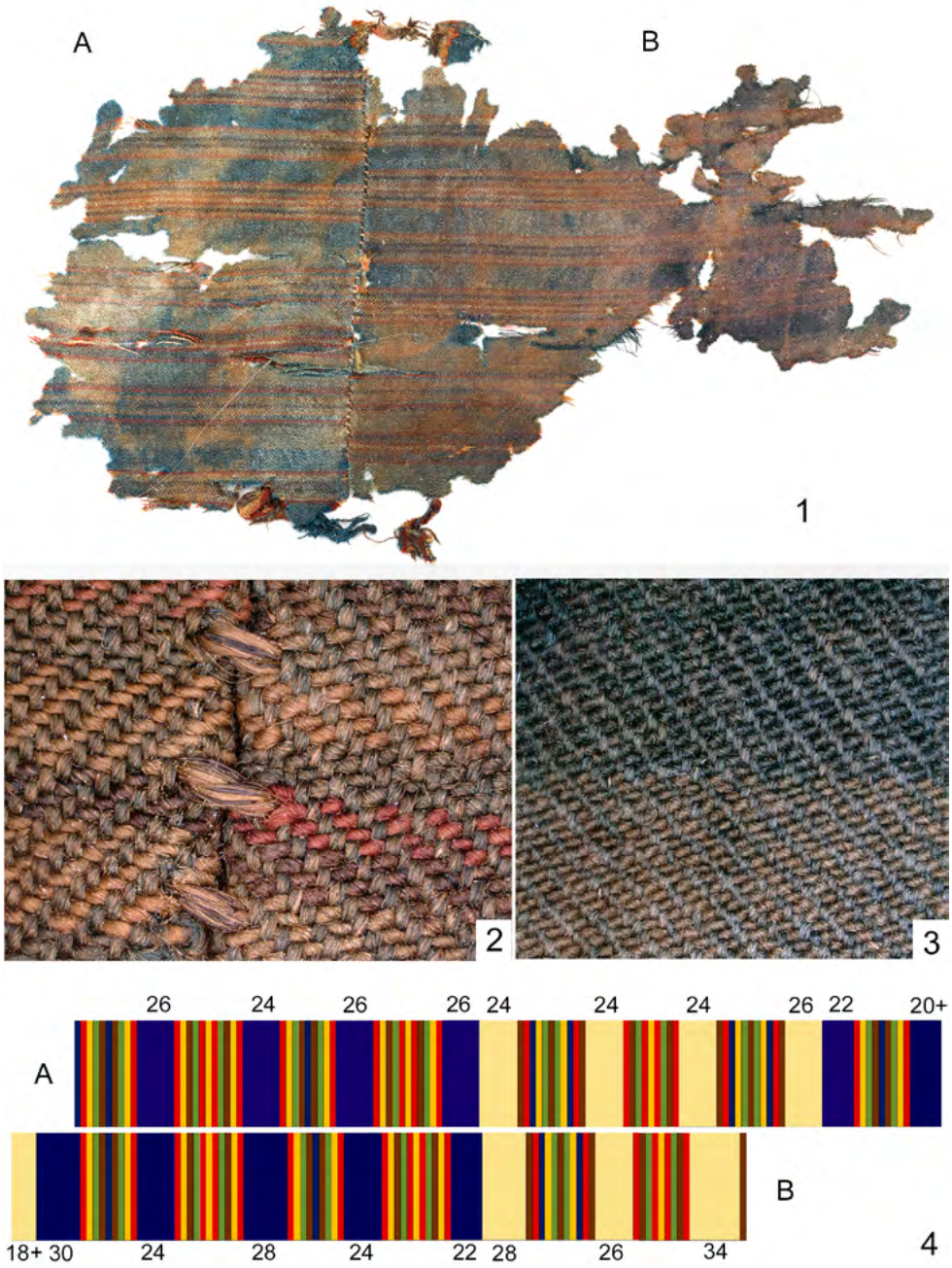

Figure 8. Fragment of two pieces of thin twill woollen fabric stitched together from Arzhan-1, Grave 4, 33 x 20 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/156-1): 1, general view; 2, detail of a seam; 3, border of two sections of the background; 4, diagrams of colourful striped pattern of fragments A and B (2, 3, micro-photographs by Dr Diego Tamburini by means of digital microscope Keyence VHX-5000 in the Department of Scientific Research, The British Museum; 4, diagrams by S. Pankova)

thread folded in four, the same as on twill fragment 12 (Table 1), which is additional evidence that both types of striped fabrics belonged to the same article.

Grave 8

In a coffin were the disarticulated bones of a man aged at least 40 and what were described during excavation as 'many remains of clothing of sable (?) fur and monochrome woollen fabric'. The remains included a fragmentary arrow shaft.[47]

Fragment 16. A large fragment of weft-faced fabric with decorative seams and a darn. 60 x 35 cm (Figure 10.1)

The decorative seam joining two fragments of brown fabric along the warp threads is made with a blue thread folded in three (Figure 10.4). The edges of the fabric are stitched together along the surviving selvages, folded over on the reverse side by 0.8–1 cm.

The top edge of the fragment is folded onto the obverse and sewn with thick hem stitches which decoratively cover the join that has been formed (Figure 10.2). By analogy with other fragments from Arzhan-1, the hem may well have originally differed in colour from the fabric, though they now look identical.

There is an embroidered pattern sewn with blue stitches consisting of two concentric rhombi with their tops on each other (Figure 10.3). The fabric is now

[47] Gryaznov 1980: 21.

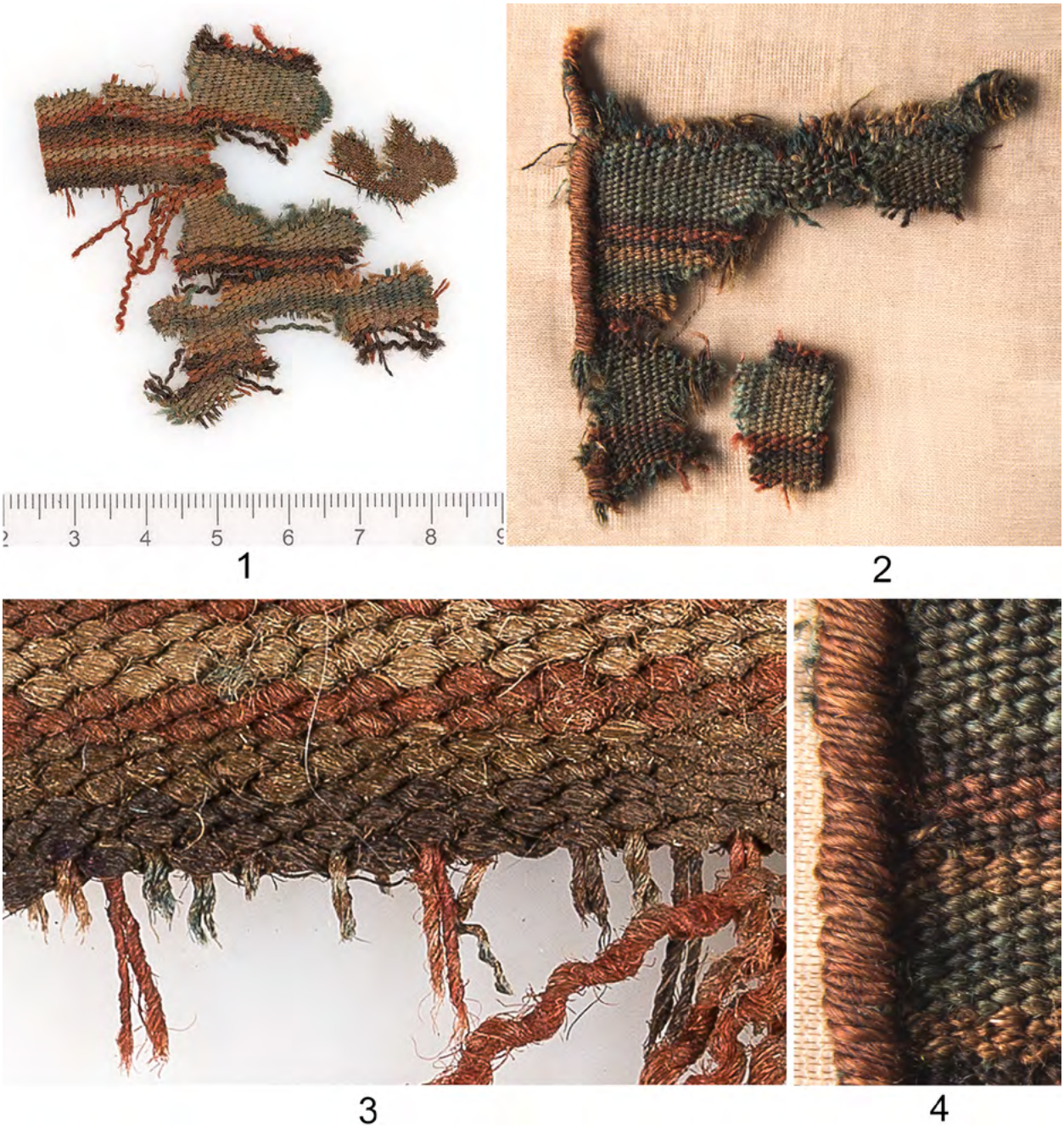

Figure 9. Two fragments of weft-faced striped woollen fabric from Arzhan-1, Grave 4, 6 x 5.5, 5 x 4.5 cm (with border) (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/156-2): 1-2, general view of two fragments; 3, fragment 1 – colourful warp threads; 4, fragment 2 – hemmed border

backed with gauze and the reverse side is inaccessible. However, according to Olga Plamenevskaya, who worked with this material prior to restoration, there was a tear which had been skilfully darned with thick thread, and 'the embroidery superbly masks the banal darning'.[48] It has proved impossible to take a sample of the threads of the embroidery but the structure of the thread and the stitches are similar to the threads of the decorative seam (an individual thread folded in three).

Grave 9

In a coffin were the jumbled bones of an adult, thought to be a man. There were 'many remains of clothing of the fur of sable (?) and other animals and of woollen monochrome fabric with embroidery.[49] There were also three bone ... arrowheads ... and one bronze one'.[50]

[48] Plamenevskaya 1975: 205.

[49] Here Mikhail Gryaznov was probably mistaken as, judging by the photograph he used, the fabric with the embroidered pattern was found in Grave 8, as previously written by Olga Plamenevskaya, relating a different fabric to Grave 9 (Gryaznov 1980: fig. 9.3; Plamenevskaya 1975: 205).

[50] Gryaznov 1980: 24–25, fig. 9.3.

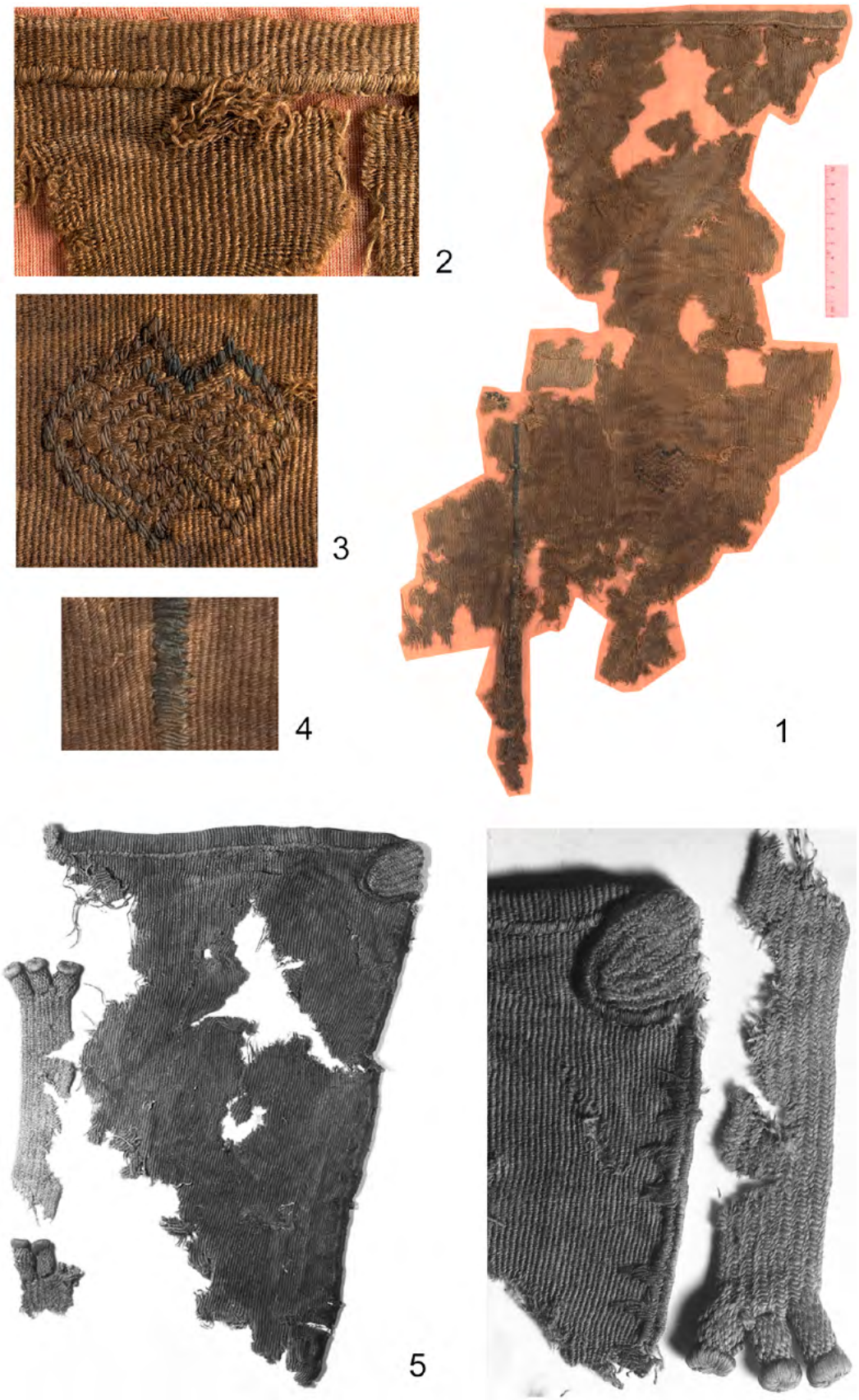

Figure 10. 1–4: fragment of weft-faced woollen fabric with a decorative darning from Arzhan-1, Grave 8, 60 x 35 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/170): general view and details; 5, fragment of a woollen article with a corner strap and strap fragments from Arzhan-1, Grave 9 (Photographs: Scientific Archive of the Institute for the History of Material Culture, Russian Academy of Science, Photographic Department, neg.III 197678, III 197679)

Fragment 17: on a black-and-white photograph from Mikhail Gryaznov's archive is a weft-faced fabric with a decorative hemmed side edge, a hemmed top and a braided strap stitched to the corner with an end in the shape of three 'nails' (Figure 10: 5).

This fabric is not in the State Hermitage Museum collection so we have to follow Olga Plamenevskaya in her description:

> 'One of the fragments of fabric (Grave 9) is worked in exactly the same way as the fragment of an article of napless carpet type from Grave 1 [the fabric with 'graduated figures' – SP]. Here were also discovered two scraps of loose ends of braid, stitched obliquely to the corner of the fabric ... The braid is 2.5 cm wide, of regular two-thread weave. Its purely decorative finish is of interest. All the threads which form the braid are divided into three parts, each of which is bound and forms a small hollow cylinder. Their edge is tightly hemmed with a thin, well-twisted coloured thread'.[51]

It is clear that these fragments represent another example of an article with corner straps (Figure 10.5). In addition, the design of the side edge – a border along a cord with triangular festoons – is similar to the patterned hem of twill fragment 11 (Figure 6). The weft-faced structure of the fabric and the fold of the edge which can be seen on the photograph are similar to those characteristics in other Arzhan fragments.

Characteristics and parallels for the textiles from the central chamber of Arzhan-1

All of the fabrics are of very high quality and the combination of finished articles, designs and details were produced skilfully and with high-quality materials. All of the items we have examined are made of woollen fibres and in some cases it has been possible to establish that it was sheep's wool.[52] Exceptionally downy wool fibre was used in the thin fabrics. Most of the threads in the examined fabrics and other details are single, spun in a right 'Z' twist. Double threads twisted into an S-shape are also encountered: that is how all the attaching threads are made, and also individual threads in the structure of some fabrics.

The examined material includes fabrics of twill and plain weave and also examples in the patterned twining technique. The plain weave fabrics are dominated by weft-faced structures: two have typical *kilim* patterns (fragments 2–3 and 4) and in others the method of a change in the interlacing was used to create the decorative details (fragment 10 and probably 14–15).

After weft-faced the next most frequent structure is weft twining. Both may be combined in a single article: a twining border can reinforce the edge of a *kilim* (fragment 2) and a strip of patterned twining decorates a weft faced fabric (fragment 10). The patterned twining technique was also used for the thick fabric from Grave 1 (fragment 1). It is the identicalness of the raw material of these fabrics and the finishings that leads us to assume that the whole articles were made in the same workshop or household.

The twill fabrics are made in 2:2 and 1:2 weaving. It is probable that all of these fragments – which came from a single burial – belonged to the same article whose finish and details of folds, embroidered border festoons, masked seams and corner straps were made in a similar way to the weft-faced fabrics (including *kilim*). Thus, even if we assume that the thin striped twill was imported, its assembly into a finished article was most probably carried out in the same place as that where the weft-faced fabrics were produced and assembled.

In some cases the fabrics and braided articles are combined (fragments 1, 2, 17). Examples of four or five types of braiding are represented: plain oblique interlacing (fragment 4: Figure 4.5), twill oblique interlacing (fragments 1, 17: Figures 2.1, 10.5) and the weaving of fragments 5, 8–9 and 10 (Figures 4.4, 2.4, 5.2).

The disturbed condition of most of the burials and the fragmentary nature of the textile finds do not allow a firm identification of the original function of the cloth fragments yet none contain any elements such as distinctive details of a sleeve, neck/collar, waist or trouser leg which might otherwise have confirmed that they were articles of clothing. The fragments with processed edges and corners probably belonged to articles of the same type as they were rectangular pieces and occasionally with corner straps. It may be that the loose ends of braid on the border of the thick fabric from Grave 1 were also corner straps.

Fragments with braid stitched to the corner and bordered edges were found in three of the five central burials at Arzhan-1 with surviving fabrics (Graves 1, 4 and 9), and in Grave 1 (including the thick fabric) there were two, perhaps for the 'chieftain' and his companion. It is possible that the large fragment with darning from Grave 8 was also part of this type of article. It is therefore likely that all the burials in the central chamber at Arzhan-1 were accompanied by textile items of a similar function.

The character of the fragments and the graduated pattern on one piece led Nikolai Smirnov to suggest

[51] Plamenevskaya 1975: 205, fig. II.2–3.

[52] No special examination of the fibres has been conducted to determine the specific species and breeds of animals whose wool was used as raw material: this should be the next stage of research.

that they belonged to skirt-girdles similar to those depicted on warriors of a specific type on late Assyrian reliefs.[53] In contrast, Elena Tsareva, who also considered the straps, suggests that the Arzhan-1 articles may have been curtains or carpets.[54] In our opinion, whatever these articles may originally have been, in the burials they fulfilled the function of litters, coverlets or shrouds. Textile finds made in the tapestry weave *kilim* technique are now known from many funerary monuments in central Asia from the 1st millennium BC to the early centuries AD, particularly from the Tarim Basin.[55] Outstanding individual finds of *kilims* were preserved at Arzhan-2[56] and in the second Pazyryk barrow,[57] although there, as at Arzhan-1, the question of their place of manufacture remains unresolved. Nevertheless, they may all be evidence of the wide dissemination of *kilim* technology among the Iranian-speaking pastoralist tribes of central Asia.[58] Some of the earliest surviving examples of tapestry weaves, including those with graduated patterns, come from the Tarim Basin cemeteries of Xiaohe and North cemetery which date from the early 2nd millennium BC.[59]

The pattern in the form of graduated figures, as on the kilim from Grave 1, is, at the same time, very specific and universal: the character of the pattern is largely dictated by the technology of tapestry-weaving, and before that most likely from mat and basket-weaving. At the same time this pattern, like any traditional design, certainly included a specific concept. It was already widespread in monuments of the eneolithic period in southern Turkmenistan, Afghanistan and Iran, and later considerably more widely in central Asia and the Near East, on stone and pottery vessels, in seals and architectural décor, and also by reconstruction in textile materials, probably the earliest in many respects.[60] This motif is still popular in carpet-weaving in the ornamental tradition of peoples of the Near East and central Asia.[61] It was to this motif that Mikhail Gryaznov was alluding when he proposed that the Arzhan-1 textiles were of Near Eastern origin. Nikolai Smirnov, who decided to examine and give concrete expression to this supposition, adduces as examples drawings on late Assyrian reliefs from the palace of Sargon II (722–705 BC) at Khorsabad depicting warriors in skirt-girdles or tunics with graduated figures near the bottom edge, but also chariots and siege machines whose bodies (possibly woven) are completely covered in a network of graduated rhombi.[62] This and similar motifs can also be seen in the clothing of Assyrian soldiers and captured Syrian women on other late Assyrian reliefs from the 9th century Northwest Palace at Nimrud and 8th century wall-paintings from Til Barsib in north Syria, all broadly contemporary with the textiles from Arzhan-1 (Figure 11).[63] These motifs depicted on Assyrian monuments and their possible prototypes require further research irrespective of the Arzhan-1 textiles. However, the spread of a motif in the form of graduated 'pyramids' and 'rhombi' is also recorded in textiles from the early 1st millennium BC in Xinjiang, which is closer to Tuva. It is encountered as designs on woollen trousers from the Yanghai and Zaghunluq cemeteries, and the crotch on several pairs of trousers has the shape of a similar graduated pattern (Figure 12).[64]

In general, there are quite a few parallels to the characteristics of the Arzhan-1 textiles in burials in the Tarim Basin, especially from the Zaghunluq cemetery.[65] One obvious feature of the textiles from Arzhan-1 is the finishing of the edges and the covering of fabric joins of various types with decorative hems or cords. This feature was characteristic of items of clothing preserved at sites in the Tarim Basin,[66] and textiles from the Pazyryk barrows in the Altai mountains (Figure 13: 1–2).[67] Instances of the formation of a pattern by change in interweaving and with doubled warp ends (as on fragment 10 and, probably, 14–15) has been noted on many textiles from Zaghunluq and Dzhumbulak Kum which have narrow decorated bands (Figure 13: 3–6).[68]

Embroidery darning very similar to the rhomboid pattern from Grave 8 at Arzhan can be seen on several woollen articles from burials at Zaghunluq: a rectangular coverlet, a skirt and a jacket with a coloured pattern (Figure 14: 1–3).[69] Made with contrasting threads in one of the colours of the fabric pattern, they not only masked the repair of the article but also decorated it. The coverlet from Zaghunluq mentioned earlier is bordered by woven braids which go beyond its side

[53] Smirnov 2009: 113–14, 117.
[54] Tsareva 2010: 574.
[55] Debaine-Francfort and Idriss eds 2001: 154, 187, cats 74–75, 80; Wang Bo 2016: 145, no. 7, 157, no. 11, 197, no. 21, 211, no. 25, 215, no. 27, 241–43, nos 36–37, 270, no. 45, 276, no. 48, etc; Baumer 2012: 222; Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001: 193–221.
[56] Stauffer 2010: figs 204–205.
[57] Rudenko 1970: fig. 157a–b.
[58] Tsareva 2010.
[59] Sylwan 1941: 77–79, pls XII.6, XIV.3–4; Cardon *et al.* 2013: 77–78, figs 6, 8, 12. Interestingly plant fibre baskets found in the same cemeteries have similar patterns.
[60] Zotova 1965: 180–81; Kircho 1975; Smirnov 2009.
[61] Tsareva 2010: 574.
[62] Smirnov 2009: 117.
[63] Collins 2008: 47–50; Parrot 1961: 107, fig. 116; Tomabechi 1984. We are grateful to St John Simpson for providing this information.
[64] Wieczorec and Lind eds 2007: 189, cat. 85; Beck *et al.* 2014: figs 2–4, 11, 14; Wang Bo 2016: 135, no. 3, 159, no. 11, 282–83, no. 50, 290, no. 53.
[65] Wang Bo 2016.
[66] Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001: 194, nos 372–73, 196, no. 378, 208, no. 404, 221, no. 416, etc.; Debaine-Francfort and Idriss eds 2001: 145 (fig. 3), 152 (fig. 3), 190; Wang Bo 2016: 151–52, no. 9, 179–80, no. 14, 191, no. 18, 193, no. 19, 201–202, no. 22, 226–27, no. 31, 264–65, no. 43, 267–68, no. 44.
[67] Polosmak and Barkova eds 2005: figs 3.13, 4.11; Simpson and Pankova eds 2017: 320.
[68] Wang Bo 2016: 128–29, no. 1, 138–39, no. 5, 186–87, no. 17, 209–14, nos 25–26, 222–26, nos 30–31; Debaine-Francfort and Idriss eds 2000: 186.
[69] Wang Bo 2016: 193, no.19, 213, no. 26, 271–72, no. 46.

Figure 11. Graduated figure pattern on cloths depicted on late Assyrian wall paintings and reliefs: 1, Til Barsib palace, room XXIV: painting on a mudbrick wall (after Parrot 1961); 2–3, sculpture from the Northwest Palace of Ashurnasirpal II (884–859 BC), Nimrud (after Collins 2008 = The British Museum, inv. nrs 124554, 124552)

edges, like on Fragment 1 from Arzhan-1 (Figure 14: 1), although it is difficult to say from the publication what its purpose was, for instance to create corner straps or to make up part of a fringe. There are several coverlets in Zaghunluq burials and perhaps were similar to the Arzhan-1 rectangular textiles.

The specific pattern on the thick fabric from Grave 1 in the form of a slanting lattice with cells of various colours is also similar to the pattern on a twill woollen blanket from Zaghunluq (Figure 14: 4).[70]

Many items of clothing from the early 1st millennium BC from cemeteries in the Tarim Basin were not cut out: their sections were woven specially to conform with the shape of the desired article,[71] or the necessary outlines were obtained by folding the excess material onto the reverse.[72] These characteristics were, to all appearances, typical of clothing of central Asian nomadic pastoralists at the beginning of the early Scythian period. It is possible that they are also reflected in the textile

[70] Wang Bo 2016: 292, no. 54.

[71] Beck *et al.* 2014; Schorta *et al.* eds 2016: 131–35, nos 2–3, 282, no. 50.

[72] Wang Bo 2016: 155, no. 10, 179–82, nos 14–15, 264–68, nos 43–44, 272, no. 46.

Figure 12. Graduated design and crotches on woollen trousers from the Tarim Basin cemeteries: 1, Zaghunluq, Grave 85QZM4; 2, Zaghunluq, Grave 98QZIM147; 3, Yanghai, Grave 21 (1-2, after Shorta *et al.* eds 2016; 3, after Beck *et al.* 2014)

materials from Arzhan-1 although, as previously stated, there is not yet any basis for relating them to clothing which may have been of fur or leather.

The examples of braiding from Arzhan-1 also have parallels among surviving textiles from the monuments of central Asian nomadic pastoralists. A bicolour belt similar to Fragment 4 from Arzhan-1 (Figure 4.5) was found in the Dzhumbulak Kum cemetery.[73] Twill oblique interlacing strips similar to the straps from Grave 9 are encountered in the Second Bashadar kurgan,[74] the Verkh-Kaldzhin 2 cemetery[75] and Arzhan-2,[76] as well as in the cemeteries in the Tarim Basin: Dzhumbulak Kum,[77] Zaghunluq[78] and Sampula.[79] This technique was known already to the Bronze Age population of the Tarim Basin judging by finds in Xiaohe cemetery.[80] The braid on the border of the thick fabric from Grave 1 was made in a similar technique but with a colourful pattern so far unknown among ancient braids.

The local production of textiles by the Tarim Basin inhabitants is confirmed by finds in burials of cloth-making equipment such as spindle whorls and bobbins with threads, and supported by the favourable climatic conditions for both textile production (oasis lifestyle with developed nomadic pastoralism) and dyeing.[81] A considerable number of parallels for the Arzhan-1 textiles in Tuva are now attested from Xinjiang and permit us to consider these regions to be connected in terms of textile production or distribution. It may also be that specific traditions in the manufacture of textiles were common to the horse-breeding nomads in various parts of central Asia in the Scythian period, as 'western Mongolia, Tuva, Altai, Xinjiang and Kazakhstan all

[73] Debaine-Francfort and Idriss eds 2001: 166.
[74] Rudenko 1968: 72, fig. 61.
[75] Polosmak and Barkova eds 2005: 186.
[76] Stauffer 2010: figs 190, 197, 208.
[77] Debaine-Francfort and Idriss eds 2001: 148 (fig. 5), 154, 179, 185.
[78] Wang Bo 2016: 137, no. 4, 179–80, no. 14, 229, no. 32, 243, no. 37, 256, no. 40.
[79] Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001: 325, fig. 324, 190–91, figs 361–64, 192, fig. 368-1, etc.
[80] Sylwan 1941: 55–60, pl. X.2–3; Zhongguo Sichou Bowuguan, Xinjiang Weiwu'er Zizhiqu Wenwu Kaogu Yanjiusuo 2013: 26–27.
[81] Polosmak and Barkova eds 2005: 169.

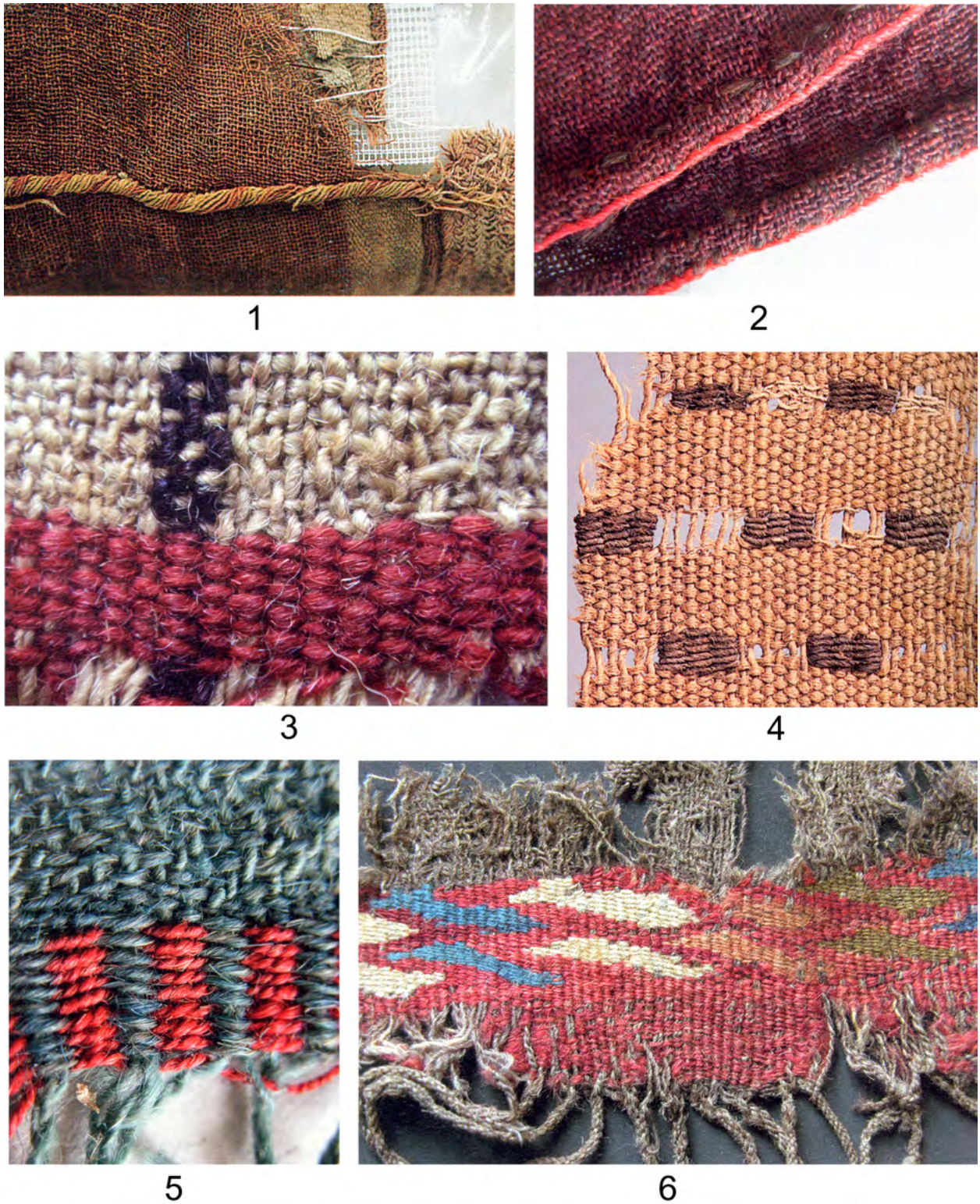

Figure 13. Pipings and ornamental bands with warp ends doubled in textile objects from the Tarim Basin cemeteries: 1, Dzhumbulak Kum, D, Grave 10; 2, Zaghunluq 98 QZIM136; 3, Zaghunluq 96 QZIM65; 4, Dzhumbulak Kum, B, Grave 1; 5, Zaghunluq 85 QZM2; 6, Zaghunluq 96 QZIM4 (1, 4: after Debaine-Francfort and Idriss eds 2001; 2, 3, 5, 6: after Wang Bo 2016)

belonged to the same circle of cultures of the Saka type'.[82] The fact that textiles found in Arzhan-1 come from the Tarim Basin is therefore highly possible but it is still premature to draw certain conclusions. It is necessary to carry out a comparison of textiles from both regions based on all their features: the nature and

[82] Shulga and Shulga 2015: 532.

Figure 14. Embroidery darning and lattice pattern on textile objects from Zaghunluq cemetery in the Tarim Basin: 1, coverlet from 96 QZIM4 and a detail with darning; 2, mended patch of a skirt from 96 QZIM64; 3, mended patch of a painted jacket and a detail from 98 QZIM103; 4, twill blanket pattern from 98QZIM139 (all after Wang Bo 2016)

structure of the fibre and threads, the characteristics of the weaving and the respective dye composition used. Moreover, unlike Arzhan-1 which relates to the early Scythian period, the published textiles from Zaghunluq come from a long chronological period and are in need of further study in the first instance. These Tarim Basin materials need special attention in the future study of Scythian period textiles from the Altai-Sayan region.

Dye analyses

The aim of this research was to determine the composition of the dyes in order to identify their possible sources and also further compare with data on fabrics from other central Asian tombs of the Scythian period. A total of 35 samples of threads from ten fragments were examined.

Methods of examination

The methods used for studying fabrics from the Arzhan-1 kurgan were: optical microscopy (a German LEICA M60 with a IC80 HD digital camera and a LEICA DM 2500 P polarizing microscope with a DFC 295 digital camera), quality microchemical analysis and tandem quadrupole chromatography-mass spectrometry.

The composition of the dyes was determined on new equipment from Agilent Technologies (USA) installed in the Laboratory for Physical-Chemical Examination of Materials of the State Hermitage Department for Scientific Examination and Authentication of Works of Art. This Series 1200 system of ultra-high-performance liquid chromatography, in tandem with a Series 6420 triple quadrupole mass spectrometer, is able to reliably identify even small traces of substances in combination, which is particularly important in the study of complex mixtures of aged dyes on small fabric samples.

Preparation of samples

A coloured thread 0.5 cm long was heated to a temperature of 105°C for ten minutes in 0.25 ml of solution: hydrochloric acid / methanol / water (2:1:1 by volume). The mixture was then steamed in a nitrogen atmosphere at 60°C until it was dry. The dry remnant was dissolved in 0.2 ml of solution: methanol / water (1:1 by volume) and then centrifugalized for five minutes at 12,000 rpm. The dissolved sample was passed through a filter and placed in a vial for further examination. If the sample was violet, blue or green in colour, it was preliminarily heated in 0.2 ml of dimethyl sulfoxide at 100°C for ten minutes to extract the indigoids.[83]

A ZORBAX SB-C18 column (length 50 mm, diameter 2.1 mm; diameter of particles 1.8 micrometres) was used to separate the dyes. The column was thermostatted at 40°C. The mobile stage consisted of the mixture: component A – water (an 0.2% solution of formic acid) and component B – acetonitrile. Gradient elution was used in accordance with the following programme: minutes 0-1 with a water-acetonitrile ratio of 15%–85%, minutes 1-5 with a water-acetonitrile ratio of 25%–75%, minutes 5–10 with a water-acetonitrile ration of 55%–45%, minutes 10–16 with a water-acetonitrile ratio of 98%–2%, minutes 16–18 with a water-acetonitrile ratio of 15%–85%, minutes 18–25 with a water-acetonitrile ratio of 15%–85%. The flow rate of the eluant was 0.3 ml per minute.

Conditions of the mass-spectrometric detection

Ionization was carried out in an electrospray at atmospheric pressure in negative mode. The temperature of the drying gas was 350°C and its flow rate was 11 litres per minute. The gas pressure in the nebulizer was 25 psi. The voltage on the capillary was 4,000 v.

Control of all the components in the system, including an ultra-high-performance liquid chromatograph, a diode matrix detector, a mass-spectrometer and a vacuum system, as well as the collection and processing of the chromatographic and mass-spectrometric data, was achieved with the aid of the Mass Hunter programme, pre-set on a work station with a Windows 7 Operating System, 64 bit. The work was carried out in the multiple reaction monitoring (MRM) mode. The results were compared with earlier data on standard dyes and dyed fabrics in modes of full scanning, scanning of precursor and daughter ions, selected ion monitoring (SIM) and multiple reaction monitoring (MRM).

Brief results of the examination of dyes are shown in Table 2.

In ideal conditions the percentage ratio of the components of a dye separated from a fabric would indicate the specific variety of plant or insect used as sources of the dye. However, this ratio is dependent on a significant number of factors which are impossible to assess reliably for such ancient samples: besides the source of the dye, these factors include the conditions and methods of dyeing, the sequence of colours, the destruction of dyes over time, the conditions of separating the dyes during analysis, and so on. An additional factor for plant dyes is the growing conditions, including the amount of sunlight and precipitation. We therefore do not include percentage characteristics for each identified substance in this paper but concentrate on the principal components and their combinations.

All of the identified dyes, with the exception of indigo, needed mordants. Mordants (aluminium, iron, lead and copper salts) are used to reinforce the dye on a fibre: different mordants give different shades to dyed fabrics. Our purpose was not to determine the mordants used in dyeing the Arzhan-1 fabrics, as a fabric could have assimilated the same elements (iron, aluminium, copper) from the soil after spending centuries in the ground and it is often impossible to distinguish between the presence of a specific mordant and pollution from the soil. Tannic substances may also have been used as mordants, serving as extra reinforcement of the dye on the fabric.

Red

In order to obtain the colour red, madder or madder-related plants such as bedstraw (*Gálium genus*) were almost always used and in mixture either with horse sorrel (Asiatic dock, *Rumex confertus*) or rhubarb (Rheum) (five samples), or with kermes (*Kermes vermilio Planchon*) (three samples). Most of the samples dyed with madder are dominated by purpurin, so one could posit the use of the common wild madder (*Rubia peregrina L.*), but it would be premature to finally establish the species of madder owing to the small quantity of materials that have been examined. Besides, in theory it is conceivable that other as-yet unknown methods were used to extract purpurin from other species of madder.

[83] Petroviciu *et al.* 2011; 2012.

No.	Item	Sample: thread/colour	Dyes	Dye sources
	Grave 1 **Fragment of thick fabric with a border of braided strips** (Fr. 1) **(Inv. No. 2878/155). Fig. 2: 1, 3**			
1.	Fabric	**Dark-brown** weft (originally red)	1. Kermesic acid 2. Gallic acid, catechin 3. Lac acid E	Kermes Tannic plant Lac bug
		Brown-red/cocoa weft (originally red-orange)	1. Quercetin 2. Kermesic acid, flavokermesic acid 3. Gallic acid, catechin	Plant source of yellow flavonoid dyes Kermes Tannic plant
		Light-brown/sandy warp	No dyes found. Gallic acid (trace)	–
		Light-brown/sandy weft	No dyes found	–
2.	**Fragment of article of fabric with a 'graduated figures' pattern** (Fr.3) **(Inv. No. 2878/163). Fig. 4: 3**			
	Fabric	**Brown** warp	No dyes found	–
		Red weft	1. Purpurin*, alizarin 2. Kermesic acid (trace), flavokermesic acid (trace)	Madder Kermes
		Claret weft (originally dark-red)	1. Purpurin 2. Kermesic acid, flavokermesic acid 3. Gallic acid	Madder Kermes Tannic plant
		Brown weft (originally violet or green)	1. Indigo* 2. Chrysophanic acid* 3. Alizarin, purpurin 4. Kermesic acid, flavokermesic acid	Indigo-bearing plant Horse sorrel or rhubarb Dyer's madder Kermes
		Yellow weft	1. Purpurin, alizarin (trace) (no yellow dyes were found)	Madder
		Green weft (originally light-blue)	1. Indigo and product of its destruction isatin	Indigo-bearing plant
3.	**Fragment of braid** (Fr.4) **(Inv. No. 2878/164-1). Fig.** 4: 5			
		Dark-red	1. Purpurin*, alizarin 2. Rein (trace)	Madder Horse sorrel or rhubarb
		Blue-green (originally blue-violet or green)	1. Indigo* 2. Chrysophanic acid* 3. Purpurin, alizarin 4. Gallic acid	Indigo-bearing plant Horse sorrel or rhubarb Madder Tannic plant
4.	**Woven braid 1** (Fr.8) **(Inv. No. 2878/167). Fig. 2: 4a**			
		Brown	No dyes found	–
5.	**Woven braid 2** (Fr.9) **(Inv. No. 2878/168). Fig. 2: 4b**			
		Dark-brown	No dyes found	–
6.	**Grave 2** **Dark-green fabric with a patterned border and braid** (Fr.10) **(Inv. No. 2878/158). Fig. 5**			
	Main fabric	**Brown** warp	No dyes found	–
		Green-blue weft	1. Indigo 2. Gallic acid	Indigo-bearing plant Tannic plant
	Cord on the join of the fabric and the woven braid	**Dark-blue** (originally dark-green)	1. Indigo* 2. Chrysophanic acid* 3. Gallic acid, catechin (trace)	Indigo-bearing plant Horse sorrel or rhubarb Tannic substances contained in the roots of horse sorrel

Table 2. Dyes of the Arzhan textiles and their probable sources (asterisks designate the prevalent dye component)

No.	Item	Sample: thread/colour	Dyes	Dye sources
	Wefts of the patterned border	**Sandy** mixture of light-blue and light-brown fibres in the thread (originally green)	1. Indigo (in the light-blue fibres) 2. Gallic acid (in the light-brown fibres)	Indigo-bearing plant Tannic plant
		Blue	Indigo and product of its destruction isatin	Indigo-bearing plant
7.	**Grave 4** **Fragment of striped fabric – corner of an article with a border and braid** (Fr.11) **(Inv. No. 2878/161). Fig. 6**			
	Fabric	**Blue/dark-brown** weft (originally green)	1. Indigo* 2. Gallic acid* 3. Chrysophanic acid* 4. Quercetin	Indigo-bearing plant Tannic plant Horse sorrel or rhubarb Plant source of yellow flavonoid dyes
		Blue warp	Indigo	Indigo-bearing plant
8.	**Fragment of striped fabric – side fragments with decorative border on the edges** (Fr.12) **(Inv. No. 2878/166). Fig. 7**			
	Fabric	**Red** warp	1. Purpurin*, alizarin 2. Rein	Madder Horse sorrel or rhubarb
		Light-brown warp (2 samples)	No dyes found No dyes found	– –
		Blue warp (originally violet or green)	1. Chrysophanic acid*, emodin 2. Indigo* 3. Purpurin*, alizarin 4. Gallic acid	Horse sorrel or rhubarb Indigo-bearing plant Madder Tannic plant
		Blue-green warp	1. Indigo* 2. Chrysophanic acid*, emodin 4. Gallic acid	Indigo-bearing plant Horse sorrel or rhubarb Tannic plant
		Blue weft	Indigo	Indigo-bearing plant
	Hem thread	**Dark-auburn**	1. Purpurin*, alizarin 2. Carmine acid, kermesic acid 3. Kermesic acid, flavokermesic acid 4. Rein, emodin	Madder Carmine-bearing insects Kermes Horse sorrel or rhubarb
9.	**Fragments of polychrome striped kilim** (Fr.14) **(Inv. No. 2878/156-2). Fig. 9: 1**			
	Fabric	**Red** weft	1. Alizarin, purpurin 2. Rein (trace).	Madder Horse sorrel or rhubarb
		Dark-brown weft (originally dark-red)	1. Purpurin*, alizarin 2. Kermesic acid 3. Gallic acid	Madder Kermes Tannic plant
		Light-blue/green weft Mixture of light-blue and light-brown fibres in the thread (originally green)	1. Indigo (in the light-blue fibres) 2. Rein, emodin (in the light-brown fibres)	Indigo-bearing plant Horse sorrel or rhubarb
		Blue weft Mixture of light-blue and brown fibres in the thread (originally violet)	1. Indigo (in the light-blue fibres) 2. Purpurin*, alizarin 3. Rein (trace), emodin (trace) (2-3 – in the brown fibres)	Indigo-bearing plant Madder Horse sorrel or rhubarb
10.	**Grave 8** **Fragment of an article with darning masked as embroidery** (Fr.16) **(Inv. No. 2878/170). Fig. 10: 1**			
	Fabric	**Brown** warp (originally red)	1. Purpurin*, alizarin 2. Chrysophanic acid, rein	Madder Horse sorrel or rhubarb

Table 2. Continued

No.	Item	Sample: thread/colour	Dyes	Dye sources
		Brown weft (originally orange-red)	1. Alizarin*, purpurin 2. Rein (trace)	Madder Horse sorrel or rhubarb
	Joining/hem thread	**Blue**	Indigo	Indigo-bearing plant

Table 2. Continued

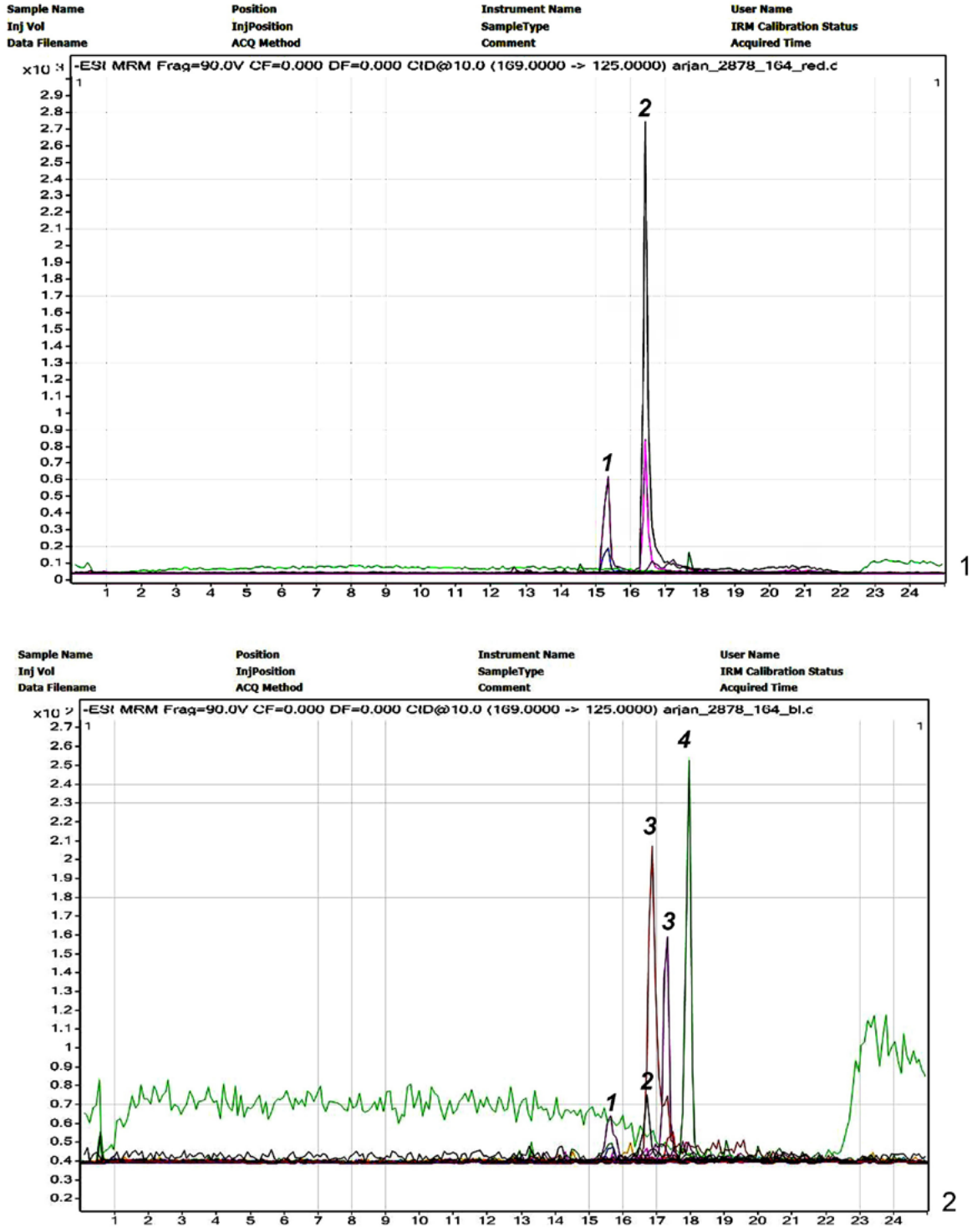

Figure 15. Examples of mass-spectrograms of dyes in multiple reaction monitoring mode (MRM) for Fragment 4 from the Arzhan-1 barrow (1 for the red dye: 1, alizarin; 2, purpurin. 2 for the violet/purple dye: 1, alizarin; 2, purpurin; 3, indigo; 4, chrysophanic acid) (The State Hermitage Museum, St. Petersburg, inv. nr. 2878/164)

The principal species of madder used for the dyeing are not native to the Altai-Sayan region. Madder-related plants of the *Galium* genus do grow there – around twenty species of these plants are known. They are perennial (more rarely annual) plants whose roots contain anthraquinone dyes: alizarin, purpurin, pseudo-purpurin and lucidin.[84] They contain considerably less dyestuff than the dyer's madder (*Rubia tinctorum L.*), the Indian madder (*Rubia cordifolia L.*) and the common wild madder (*Rubia peregrina L.*), and a considerably larger amount of raw material is required in order to extract the dyeing ingredients from bedstraws. We may therefore assume that the purpurin and alizarin for the Arzhan-1 fabrics were imported.

In one instance, in addition to the bright auburn thread on the hem of striped serge (Figure 6), the dye contained – besides madder and sorrel – kermes and carmine, whose source is the carmine-bearing insects of the Porphyrophora genus. 47 species of these insects are currently known, mostly prevalent in central Asia and Transcaucasia but also in the Mediterranean; three species live in the Far East. All the insects of the Porphyrophora genus provide reddish or purple dyes depending on the mordant. The best-known of these carmine-bearing insects are the Armenian or Ararat species (*Porphyrophora hamelii Brandt*) and the Polish species (*Porphyrophora polonica L.*). The Armenian insects produce mainly carmine acid with a small admixture of kermesic acid, whereas the Polish insects produce a mixture of carmine and kermesic acids. The species used to dye the bright auburn thread from Arzhan-1 has not been determined, as in such a mixture it is not possible to assess the ratio of kermesic acid relating to the insects.

Two red samples were dyed without madder: their main dyeing ingredient is kermes obtained from lac bugs of the kermes oak (*Kermes vermilio Planchon*). Kermes is prevalent in Mediterranean countries from Morocco and the Southern Pyrenees to Anatolia, Syria and Palestine. In one instance (the dark brown weft thread of the thick fabric from Grave 1) kermes was mixed with lac obtained from a brown-red resinous secretion – the product of lac bugs of some species of the Kerria genus on the bark of many trees that grow in southeast Asia, the Mediterranean, eastern and tropical Africa. The resin is a mixture of shellac, wax, albuminous substances and the multi-component red dye lac, which contains the lactic acids A, B, C, D and E. Lac is a mordant dye which turns fabrics a scarlet or crimson colour. Lac bugs are known in south and east Asia, and dye from them has been obtained since ancient times in southeast Asia, India and China.[85]

Kermes, carmine and lac are certainly dyes which were imported into Sayan-Altai. Interestingly, the thick fabric from Grave 1, which is presumed to have been made locally because of its 'roughness', had kermes in its red-brown wefts and kermes and lac in its dark brown wefts. Kermes was also used in the red, violet and brown wefts of the kilim with pyramidal designs from the same grave. Kermes was also found in the brown wefts of the striped kilim from Grave 4, and kermes with carmine-bearing insects in the bright auburn hem of the article of striped fabrics. However, all these dyeing ingredients may have been imported from distant lands and stored. The imported character of the dyes does not therefore mean that the fabrics were imported.

Blue, green and violet

All of the samples of blue, green and purple threads contain indigo (*indigotin*) as a basic ingredient. Many plants contain indigotin, so it is extremely difficult to identify its specific source. At the same time, it is clear that so-called genuine indigo from the tropical *Indigofera* genus was not used in the Arzhan-1 fabrics. It is much more likely that the blue was extracted from the dyer's weed (*Isatis tinctoria L.*) that is prevalent in central and eastern Europe, Caucasus, Anatolia and central Asia, or another indigo-bearing plant from a temperate zone. Other types of weed grow in the Altai on stony steppe, gravel, scree and water-meadows: *I. laevigata Ledeb.*, *I. oblongata DC.*, *I. costata C.F. Meyer*.[86] Many other widespread plants are considered to be indigo-bearing, but mostly grow in the temperate zone and further north – for example, the Chinese or Japanese indigo (*Polygonum tinctorium Ait.*) or the dog's mercury (*Mercurialis leiocarpa Siebold*).[87]

In addition to indigo, the light blue, light brown, blue-green and dark blue samples were found to contain horse sorrel or rhubarb dyes and tannic substances which add green tinges to the blue colour. The blue threads, and initially the green ones, contain the yellow dye quercetin. The colour green was obtained by two methods. Typically, a two-stage dyeing was used with the same dyes: initially a yellow or brown dye or a mixture of the two, followed by a blue dye. More rarely, during the actual process of making the thread yellow or brown fibres were mixed with blue fibres.

The violet colour, possibly imitating purple, was obtained by the same two methods: in the two-stage dyeing the same fibres were dyed first red, then blue, or by a mixture of red and blue fibres when the thread was

[84] Korolyuk 2003.

[85] Leggett 1944; Verhecken and Wouters 1988/89; Wouters 1985; 1990; Schweppe 1989; Oka *et al.* 1998; Yashchenko and Ambartsumyan 1999; Trojanowicz *et al.* 2004; Petroviciu *et al.* 2012.

[86] Korolyuk 2003.

[87] Grunskaya-Petrova 1939; Grossheim 1946: 357–70; Fedorov and Rozen 1950; Vulf and Maleeva 1969; Leggett 1944; Trojanowicz *et al.* 2004; Petroviciu *et al.* 2012.

being made. The blue indigo dye was probably obtained from dyer's weed and the red was rose madder with an abundance of red purpurin, or more rarely alizarin, whose orange colour overlapped with the crimson colour of the kermes. Indigo from dyer's weed, madder and kermes was therefore used to produce the colour purple. In addition, all the samples contained small amounts of horse sorrel dye and two also contained tannic substances which had little effect on the preliminary violet colour but created a deeper and richer shade. In some samples there was an abundance of chrysophanic acid from the horse sorrel, which could have added a green tinge to the violet threads. A similar triple-dyeing method with an eventual green colour can be seen in a woman's skirt from the second Pazyryk kurgan.[88]

Yellow and brown

In all the samples where dyes were discovered, these colours were obtained from flavonoid and tannic plants. Yellow flavonoid dyes and tannins are dyes which are among the most unstable and liable to destruction, which may be why no dyes whatsoever were found on several samples which are now yellow or brown in colour.

The only yellow flavonoid dye to survive in the Arzhan fabrics is quercetin from the anthraquinone group. It is found in various parts of many dye plants: the bark and wood of oak, buckthorn and fruit trees, sumac and onion skin, some yellow flowers and the leaves of herbs such as St. John's wort, celandine, etc., thus no specific source can be indicated.[89] From plants native to Altai one can mention the larkspur (delphinium), represented by eight species. All these plants contain quercetin and isorhamnetin and are used to dye silk and wool, producing warm yellow, brown and olive colours depending on the mordant.[90] A plant native to the mountainous regions of central and eastern Siberia and the Far East is the golden rhododendron (*Rododendron aureum Georgi*), whose leaves and bark contain the flavonoids quercetin and kaempferol, as well as tannic substances.[91]

Among the plants growing in Siberia and used by local residents as dyes are species of rhubarb (*Rheum*) and sorrel (*Rumex*). Dense-flowering rhubarb (*Rheum compactum L.*) is a perennial plant with thickened roots which grows in the forest and mountain zones of the Altai. The *Rheum* genus is prevalent in central Asia. The roots contain tannic substances and anthraquinones: chrysophanic acid, emodin, aloe-emodin, rein and physcion, which dye wool brown and black. This genus and others are also used for tanning leather.[92] There are 12 species of the sorrel (*Rumex*) genus in the Altai region, all perennial or biannual plants with well-developed roots and growing in moist places, on pebbles, on the shores of bodies of water and in marshy meadows. Horse sorrel (Asiatic dock, *Rumex confertus L.*) grows only on plains in the Altai. The *Rumex* genus is found in every continent, including central Asia, central and southern Europe. Its roots, rhizomes and leaves contain tannic substances (catechins, gallic acid, etc.) and anthraquinones (emodin, oxalic acid, chrysophanic acid, aloe-emodin, rein and physcion). The plant is used for tanning leather and dyeing wool yellow, brown or black depending on the mordant.[93] The identical chemical composition of the dyes from rhubarb and sorrel makes it impossible to distinguish them.

A similar composition of anthraquinones and tannic substances is contained in the leaves and bark of the alder or breaking buckthorn (*Frangula alnus Miller* or *Rhamnus frangula L.*), which grows in Siberia, including southern Tuva and the plains of the Altai. Its main area of distribution is Europe, the Caucasus, western and central Asia. The fruit of the purging buckthorn (*Rhamnus cathartica L.*), which grows in light forests and on the rocky slopes of low mountains in the Altai, contains the anthraquinones emodin and frangulin. In addition to the above-mentioned, the presence of other anthraquinones is necessary for identifying these plants and their fruit: rhamnoxantin, frangulin, rhamnetin, etc. The main natural habitat of the buckthorn is Europe, the Mediterranean, Caucasus and central Asia.[94]

The bark of the larch (*Larix*), which is prevalent in western and central Siberia and in northwest China contains tannic substances which produce light brown and brown dyes. The bark of the willow (*Salix*), which is represented by many species in the Altai, contains flavonoids and tannic substances.[95]

Other elements identified in the yellow and brown samples were gallic acid (tannin group), chrysophanic acid, catechin, rein and emodin (anthraquinone group). The combined presence of these components points to horse sorrel (*Rumex confertus L.*) or rhubarb (*Rheum*) as the dye source and these plants grow in Sayan-Altai and were used until recently for dyeing.

[88] Kundo 2005: 207.
[89] Fedorov and Rozen 1950; Vetchinkin 1966; Vulf and Maleeva 1969; Petroviciu *et al.* 2011.
[90] Korolyuk 2003.
[91] Korolyuk 2003.
[92] Fedorov and Rozen 1950; Vetchinkin 1966; Vulf and Maleeva 1969; Blazhey and Shutyy 1977; Korolyuk 2003.
[93] Fedorov and Rozen 1950; Vetchinkin 1966; Vulf and Maleeva 1969; Blazhey and Shutyy 1977; Korolyuk 2003.
[94] Fedorov and Rozen 1950; Vetchinkin 1966; Vulf and Maleeva 1969; Blazhey and Shutyy 1977; Korolyuk 2003.
[95] Fedorov and Rozen 1950; Vetchinkin 1966; Vulf and Maleeva 1969; Blazhey and Shutyy 1977; Korolyuk 2003.

Preliminary conclusions on the results of examination of the dyes

The threads provided for analysis appeared red, auburn, blue, light blue, dark blue, yellow, green, blue-green, light brown, brown and dark brown. The colours had changed due to the passage of time and environmental effects. The most chemically stable red and blue dyes had changed to a lesser extent, but red dyes mixed with tannic substances had become brown or dark brown. Some blue threads had become green as a result of the partial destruction of the blue indigo. For the same reason the green threads had become brown or had taken on shades of blue because of the instability of the yellow dyes. Some blue and dark blue threads had initially been dyed violet, possibly imitating purple.

The textiles from the Arzhan-1 kurgan were dyed with vegetable and animal dyes. Among the vegetable sources discovered were: madder or madder related plants (the principal dyes being alizarin and purpurin), indigo-bearing plants, probably dyer's weed (indigo), horse sorrel or rhubarb (rein, chrysophanic acid and emodin), plants containing yellow flavonoid dyes (only quercetin was found) and tannic plants (gallic acid, catechin, chrysophanic acid). The tannic substances in the composition of the dyes may be components of many tannic plants or concomitant dyes extracted, for instance, from the roots of madder, sorrel or rhubarb if the roots had not been stripped of their bark. Predominant among the sources of animal dyes is kermes (kermesic, flavokermesic and carminic acids). Only one sample contained carmine-bearing insects (carminic, kermesic and flavokermesic acids) and one other belonging to lac bugs (lac acid E).

In their chemical structure the dyes relate to the following classes: flavonoids (quercetin), anthraquinones (alizarin, purpurin, rein, chrysophanic acid, emodin, kermesic acid, carminic acid, flavokermesic acid, lac acid E), tannic substances (gallic acid, catechin) and indigoids (indigo). All of the dyes used were mordant dyes, except indigo which is a vat dye. Complex blends of dyes were used and involved mixed and multi-stage methods of dyeing.

The textiles from the Arzhan-1 kurgan contain natural dyes, most of which are virtually unknown in the Sayan-Altai region. All of the above-mentioned local plants containing identifiable substances are prevalent in Europe, the Caucasus, western and central Asia and the Mediterranean and some are found in the Far East, India and China. The dye insects which were found are also not native to Altai but are prevalent in warm countries of the Mediterranean, Anatolia, Syria, central Asia and Trans-Caucasus, as well as south and east Asia. It is possible that fabrics with imported dyes were of greater value.

In theory it is impossible to exclude the use of local plants – bedstraws and indigo-bearing plants – but this seems less likely than the use of rich dyes from other regions. Local dyes which may have been used were those contained in yellow flavonoid plants, horse sorrel or rhubarb. However, in most cases they were used not on their own but in mixtures with other, more likely imported, dyes. Notwithstanding, all of the above-mentioned imported dyestuffs may have been imported from distant countries and stored, so the presumed imported character of the dyes does not necessarily mean that the fabrics themselves were imported. Imported dyes may have been delivered as raw material and used to dye local wool but may also have been imported as already dyed threads or fabrics. Therefore, the question of whether the production of the Arzhan-1 fabrics was local or not, based on the results of examination of the dyes, is still unresolved. It is necessary to collect information on the dyes of fabrics from various regions of Central Asia, compare them and clarify the possibility that certain plants were growing and certain bugs living in those regions in antiquity.

Conclusions

This research has made it possible to characterise the textiles from the central chamber of Arzhan-1, an elite kurgan of the early Scythian period. The small number of fragments examined does not yet enable conclusions to be drawn concerning their local or imported origin. On the whole, despite their variety, the Arzhan-1 fragments appear rather homogeneous, primarily because of the similar methods used in the design of their details. Many of the fabrics also have similar technological features, ranging from the character of the fibre to the type of weaving. In several cases the raw material used to make both the fabrics themselves and the connecting seams, the extra details and decorative design of the finished article is identical or very similar, which leads us to assume that the various parts were made in the same households or workshops.

The braided articles differ in technique and merit special attention in the future. A substantial number of parallels to specific characteristics of the Arzhan-1 textiles have been identified from early Scythian sites in the Tarim Basin – namely the Zaghunluq, Yanghai and Dzhambulak Kum cemeteries – which highlight that region as a place where similar textile traditions were common. It is quite likely that some of the textiles from Arzhan-1, or the fabrics for them, were made in the territory of Xinjiang although as yet there is not enough proof of this. The dyes in the Arzhan-1 fabrics included some which were certainly imported (carmine, kermes, lac) as well as others which were very probably imported (madder, indigo). Local ingredients, to all appearances, played the role of additives in mixtures of dyes. However, the presence of imported

dyes does not mean that the fabrics themselves were imported although this cannot be excluded. The places of probable origin of the different dyes, judging by the regions where they are commonest, may have varied and the sources of the dyes are difficult to define with any reliability. All this complicates the reconstruction of how they came to be in the Sayan-Altai region. The results obtained may be used for comparison with other textile materials from Sayan-Altai and neighbouring regions.

The next stage of this research should be the examination and publication of the textiles from other chambers in Arzhan-1. It is also necessary to examine the fibres of the Arzhan-1 textiles in order to determine which specific species or breeds of animals they came from and the areas of their habitat. Finally, it is important to compare the textiles from Arzhan-1 with fabrics from cemeteries of the ordinary population of Tuva in the early Scythian period[96] and from the Arzhan-2 barrow.

[96] Busova 2017.

The Sarmatian conquest of the northern Pontic region: the state of the art of the problem

Sergei Polin[1]

Abstract

The problems of the decline of 'Great Scythia' and the Sarmatian conquest of the northern Pontic region are considered in this review essay. The archaeological evidence indicates that thesr two events are separated by an interval of over a century and therefore cannot be connected. This idea was expressed a quarter of a century ago and, as this paper demonstrates, is increasingly supported over the subsequent decades with further arguments and growing archaeological data.

Keywords: Scythians; 'Great Scythia'; Sarmatians; Prokhorovka culture; kurgans; burials; amphora stamps; hillforts; settlements; fortifications

Introduction

A quarter of a century ago, based on the available archaeological sources, this author proposed the following interpretation of the final stage of the history of 'Great Scythia' in the northern Pontic region, as well as the date and nature of the appearance of the Sarmatians in the northern Pontus. 'Great Scythia' over the region within the Don and Danube came to an end between the end of the first quarter and first third of the 3rd century BC, judging by the end of kurgan construction and the abandonment of earlier settlements there by that date. The steppe territories became deserted and the very limited foci of continuing population were concentrated in late Scythian settlements around the lower Dnieper valley, the foothills of the Crimea, and the lower Danube in Dobrudzha, where over the next centuries it became known as 'Scythia Minor'.

Along with many other factors, the main reason for the decline of northern Pontic Scythia I assumed to be climatic change, as a result of which the open steppe could no longer sustain pastoral nomadism. The Scythian population became reduced in numbers and chose to concentrate near the river valleys, shifting to agriculture as the main basis of their economy. The same processes occurred in the Ukrainian forest-steppe, with the only difference that there at the beginning of the 3rd century BC there was complete desolation, and occupation only resumed at the end of the 3rd, if not 2nd, century BC when the impoverished Zarubinetska and Poienești–Lukașevka cultures are archaeologically attested in the Dnieper and Dniester forest-steppe.

The Sarmatians, whose invasion was traditionally associated with the defeat and conquest of northern Pontic Scythia, appeared in the area between the Dnieper and Don no earlier than the mid-2nd century BC. Only at the end of the 2nd or even 1st century BC did the Sarmatians became sufficiently numerous to occupy the empty steppe and they hardly affected the late Scythian habitats. The further advance of Sarmatians to the west was very slow and only at the turn of the present era did they reach the Danube. There was therefore a gap of about a century between the end of 'Great Scythia' and the appearance of the Sarmatians in the northern Pontus. The threat of Celtic invasion from the west – attested in the Olbian decree in honour of Protogen – actually did not take place, as the Celts passed by and actually went to the Balkans and Anatolia and are therefore completely innocent in the termination of Scythia's western outskirts. Thus, judging by all these facts, the finale of Pontic Scythia and the emergence of the Sarmatians in the northern Pontic region were completely unrelated events occurring at separate times.[2]

What has happened that might change this interpretation of events? Over the past quarter of a century, no evidence has yet emerged for a Sarmatian presence of the 3rd or 2nd centuries BC in the northern Pontus or Azov regions, either from re-analysis of old collections or from new excavations. This excludes even short-term raids, let along longer-term presence west of the Don. However, in the area between the Don and Dnieper there are 62 Sarmatian sites and random finds no earlier than the 2nd–1st centuries BC, plus another six dating to the end of the 2nd–1st century BC between the Dnieper and the Prut.[3]

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[2] Polin 1984; 1986; 1992; Polin and Simonenko 1990; 1997; 2004.

[3] Simonenko 2000: 158.

Meanwhile, in the lower Don region and on the eastern edge of Scythia, the chronology of Scythian monuments has been significantly refined over the past decades and various nomadic complexes of the 4th–2nd centuries BC have been analysed. The construction and destruction of the fortifications of the Elizavetovskaya hillfort during the second and third quarters of the 4th century BC were recently considered to be a consequence of intra-regional processes. It is established that at the end of the 4th century BC, if not shortly before, the population left here, as well as abandoning all settlements in the Don delta. This is believed to have occurred as a result of internecine war between Satyr and Eumel on the Bosporus.[4] Despite this, it is assumed that the local nomadic Scythian population remained in this region after the departure of the settled population as Scythian kurgans on both banks of the Don river date to the beginning of the 3rd century BC.[5] However, the dating of this group of lower Don kurgans needs further refinement, such as the Novocherkassk burial which I proposed to date to the end of the 4th or beginning of the 3rd century BC based on Chersonesus amphorae.[6] Having now refined the date of the Alexandropol kurgan to the third quarter of the 4th century BC, where similar amphorae were found in the near-kurgan funeral feast,[7] the date of the Novocherkassk burial must be raised earlier, as indeed proposed by A.V. Dedyulkin.[8] The same applies to kurgan 1 near Novo-Aleksandrovka, the original proposed dating for which was the end of the 4th or beginning of the 3rd century BC, again based on Chersonesus stamps of the first group.[9] After the discovery of such stamps in the funeral feast of the Alexandropol kurgan, which dates to the third quarter of the 4th century BC,[10] it appears that kurgan 1 near Novo-Alexandrovka requires a corresponding chronological adjustment to the third quarter of the 4th century BC; the same also applies to kurgan 12 in the Vysochino-V group.[11] This implies that the conclusion about the existence in the lower Don of a nomadic Scythian population surviving after the departure of the inhabitants of the Elizavetovskaya hillfort and neighbouring settlements at the beginning of the 3rd century BC should most likely be adjusted to the last years of the 4th century BC.

As a result of these, and other new discoveries, several very significant conclusions can be made as to the emergence of the Sarmatians in the lower Don region:

- the lower Don region in the 4th–beginning of the 3rd century BC was not Sarmatian but was inhabited by various groups of nomads of both western and eastern origin;
- the common idea that there was military activity by Sarmatians in the lower Don and northern Pontic region in the 4th–3rd century BC does not find reliable support;
- approximately at the end of the first third of the 3rd century BC there occurs, if not a complete disappearance, then certainly a drastic reduction of the nomadic population of the lower Don and, respectively, for most of the 3rd century BC in the lower Don region there was no significant permanent nomadic population;
- the archaeological material supports the conclusion made in the 1990s by S.V. Polin and N.E. Berlizov about the absence of dated early Sarmatian monuments of the 3rd century BC west of the Volga region;
- until the end of the 3rd century BC there was no serious Sarmatian threat from the east, since Tanais had acquired defensive walls no earlier than the turn of the 3rd–2nd or even beginning of the 2nd century BC;
- the earliest group of early Sarmatian monuments in the lower Don region dates to the beginning of the 2nd–1st century BC.[12]

A similar situation is recorded in the Kuban region. The concept of military-political domination of the Sarmatians (Siraks) in the Kuban steppe as early as the 4th century BC, and the subsequent continuous development of Sarmatian culture in that region,[13] should now be re-interpreted. According to N.F. Shevchenko, nomadic complexes of eastern origin dating to the 4th and beginning of the 3rd centuries BC in the Kuban region are rare and form part of a heterogeneous mass of nomadic monuments, as on the Don. They did not play any significant role in the life of the region, with their absolute incommensurability in size with the mass of the Meotic population, despite the fact that the Bosporan kingdom dominated the region at least until the beginning of the 3rd century BC and actively expanded its limits to the east. In the 3rd century BC in the Kuban region a reduction in the number of nomadic monuments was also recorded. Massive expansion and re-settlement of the Sarmatians in this region, proven archaeologically, occurs no earlier than the 2nd century BC.[14]

In the late 1990s V.Yu. Zuev conclusively revised the chronology and periodisation of early Sarmatian culture, concluding that there were no monuments of the 3rd or first half of the 2nd centuries BC in

[4] Marchenko, Zhitnikov and Kopylov 2000: 77–78; Kopylov 2002: 232.
[5] Glebov 2002: 189–90; 2007: 62–63; Kovalenko 2006: 55.
[6] Polin 1992: 68.
[7] Polin and Daragan 2010: 193–94, 208.
[8] Dedyulkin 2015: 72.
[9] Lukyashko 2000: 167–68.
[10] Polin 2010: 278–79, 286–88.
[11] Polin 2014: 516–17, 520–21.
[12] Glebov 2002: 188–94; 2003: 80–86; 2004: 127–28; 2007: 63–66; 2009; 2012; Polin 1992: 67–71; Berlizov 1996: 31.
[13] Marchenko 1996.
[14] Shevchenko 2011: 47–55.

the Volga–Ural region.[15] This was strongly opposed by Sarmatologists: V.M. Klepikov and A.S. Skripkin identified the Volga region as the horizon of Sarmatian complexes which do not contain datable imports but which occupy, in their opinion, an intermediate position in the chronological development between well-dated monuments of the 4th and 2nd–1st centuries BC, thus placing 38 complexes into the 3rd century BC. Such an odd way of dating, when the monuments are not the same as before and not quite the same as later, and therefore should be placed between, was called 'the method of limited dating age'.[16] It should be noted at once that the logic underpinning this[17] does not work in chronology and therefore it is unlikely that this method can solve the problem, as has been noted by several colleagues.[18]

In my opinion, the problem of separation of early Sarmatian monuments dating to the 3rd century BC remains unresolved, although doubtless there were monuments of this period. Probably these monuments only existed in a very small numbers as the 3rd century BC was a time of steep decline, not only in the northern Pontic region, but across the entire steppe and forest-steppe belt of Eurasia. Although there are no real changes in this direction, in his monograph on nomads of the southern Urals of the 6th–1st centuries BC, S.Yu. Gutsalov has identified groups of monuments dating from the end of the 5th/4th and 3rd–1st centuries BC. From the analysis of a few categories of objects it is obvious that monuments of the 3rd century BC should exist, but reliable chronological indicators are absent to conclusively distinguish them from either earlier monuments of the 4th century BC, or later monuments of the 2nd century BC: thus there are no criteria to identify them and, for that reason, the author correlated complexes containing arrows with those with swords and, in the absence of the latter, operated with percentage ratios of arrow types in the quiver.[19] Such a percentage is a working solution for placing them in a particular chronological group in the absence of a better technique but, without reliably dated imports or other chronological markers, the problem of identifying monuments of the 3rd century BC seems insoluble. The author quite rightly drew attention to the difficulties in relating Ural complexes with those in the northern Pontus, since there are many Uralian complexes in which bronze socketed and iron petiolated arrowheads are used together, but such a combination is inconceivable in the northern Pontic region.

In the publication considering the 6th–2nd century BC cemetery near Lebedevka village, the same problem was resolved in a somewhat different manner. Chronological groups of the 6th–5th centuries (Sauromatian), 5th–4th centuries (early stage of Prokhorovka culture) and 4th–2nd centuries BC (classical early Sarmatian) were identified there. The problem of distinguishing complexes of the last two groups was solved in a simple way. All complexes with swords of transitional types, including those with crescentic pommels and arcuate guards, large quiver sets of bronze socketed and individual iron petiolated arrowheads, late stone altars, plaques and buckles with zoomorphic relief, etc., are related to the end of the 5th and 4th centuries BC. Complexes containing swords with crescentic pommels and straight guards, individual swords with ring pommels, quiver sets of iron petiolated arrowheads with individual bronze socketed ones, etc. are instead assigned to the 4th–2nd centuries BC. Using a method referred to here as 'indirect dating', it is proposed to identify complexes of the 3rd century BC on the basis of small quiver sets (8–22 arrowheads), in which both bronze socketed and iron petiolated arrowheads occur together with the predominance of the latter and individual items of the former. Such complexes can equally date to the 4th or 3rd centuries BC but, judging by finds in the Lebedevka kurgans, such quivers when found combined with swords with crescentic pommels and straight cross-guards – as at Lebedevka-V (kurgan 27, burial 1) and Lebedevka-VII (kurgan 16, burial 4) – their dating should be narrowed from the 3rd to the beginning of the 2nd century BC.[20] It should be noted that such complexes can equally well be dated either to the 4th century BC, since the appearance of swords with crescentic pommels are reliably fixed to this period by burial 3 in the Linevsky kurgan,[21] or the 2nd–1st centuries BC as many crescentic pommel swords and straight guards are dated to this period .[22]

At the same time, according to N.E. Berlizov, in the regions of Trans-Volga and Ural there are up to 30 complexes which are tightly dated to the 3rd century BC.[23] However, it is imperceptible from the publications that one of the Sarmatologists used them for chronological constructions. N.E. Berlizov has identified Sarmatian complexes of the 3rd century BC

[15] Zuev 1998*a*; 1999: 306; 2000*a*: 306–308, 327: 2000*b*: 85–101.
[16] Klepikov 2000: 117; 2002: 96–124; Klepikov and Skripkin 2002: 66–68; Skripkin and Klepikov 2004: 97–98.
[17] Klepikov 2000: 117.
[18] Zuev 1999: 322–23; 2004: 217–18; Simonenko 2003: 301–302; Demidenko 2007: 48–54; 2010: 365–68.
[19] Gutsalov 2004: 72–78.
[20] Zhelezchikov, Klepikov and Sergatskov 2006: 37–39.
[21] Skripkin, Klepikov and Moshkova 2002: 109.
[22] In the opinion of N.E. Berlizov, I consider the late Prokhorovka culture complex of the 2nd–1st century BC to be unrelated to the early Prokhorovka culture of the 4th century BC (Berlizov 2003: 94). I cannot confirm this because I was always only interested in the question of the chronology of the Prokhorovka culture and the absence of reliable evidence for its continuity through the 3rd century BC. In principle I do not deny its existence during this period. I have also argued that the monuments of Prokhorovka culture of this century cannot be numerous and that the peak of this culture cannot be attributed to the 3rd–2nd centuries BC but instead occurred in the 2nd–1st centuries BC.
[23] Berlizov 2003; 2011: 60.

mainly using dating of beads from the collection of E.M. Alekseeva.[24] The titanic work of the latter scholar is based only on findings in the necropolises and cultural layers of the Greek cities of the northern Pontic region and did not consider finds from the barbarian monuments of southeastern Europe. Unfortunately, the dates proposed by E.M. Alekseeva are based on datings made during the 1960s and early 1970s, which were often determined very approximately, by the date of the layer, and often very widely, range over two centuries. Many types also lack any dating. Actually, in Scythian studies at that time dating schemes of the 4th–3rd century or 4th–2nd century BC were widely used but which, as it now transpires, almost all are limited to the 4th century, the beginning of the 4th century, and even the end of the 5th and beginning of the 4th centuries BC, and only a few to the end of the 4th to the beginning of the 3rd century BC. The collection of archaeological sources by E.M. Alexeeva does not cover the whole range of beads found in the Scythian kurgans of the northern Pontic region and often their dating do not correspond to those determined by the Scythian kurgans.[25] A.S. Ostroverkhov has long drawn attention to this fact. According to his observations, many types of beads from the collection of E.M. Alekseeva – which are actually not dated – receive dates based on finds in Scythian kurgans of the 5th–4th centuries BC, which also allow to expand significantly the chronological range for a number of types of beads. So, for example, according to E.M. Alekseeva, glazed composition ('faience') beads and pendants were known in the 6th century BC, and then after a long break re-appeared in the 3rd century BC and continued later. However, they are relatively frequent in Scythian kurgans of the 5th–4th centuries BC and indeed existed continuously from the 6th century BC up to the first centuries of a new era. A number of similar instances are given by that author for glass beads and pendants.[26] The majority of chronological attributions made by E.M. Alekseeva are indicative but do not give a reliable basis to assert that a particular complex is dated, for instance, no earlier than the 3rd century BC, to the 3rd century BC, or no later than that period. Partly for the identification of complexes of 3rd century BC N.E. Berlizov also used imported pottery of central Asian production but this has very wide dating parameters within the 4th to 3rd centuries BC. In short, attempts to bracket the dates of complexes using dating beads and/or central Asian pottery does not give the desired result since neither is sufficiently accurate.

Prokhorovka

In 2003–2005, the eponymous burial ground of the Prokhorovka (early Sarmatian) culture near the village of Prokhorovka in the Orenburg region was investigated. The burial ground gave the name to the early Sarmatian culture, the material complex of the culture was characterised by groups of artifacts from this burial ground, whose chronology is also of considerable interest. M.I. Rostovtseff encountered difficulties in dating the kurgans near Prokhorovka. Silver dishes from kurgan 1 he defined as Achaemenid and, guided by the dating of the inscriptions on them, concluded that they dated to the 4th–3rd centuries BC. On the other hand, the dating of the monuments of the Kaniv and later Poltava groups of monuments in the near-Dnieper forest-steppe was taken into account by him, which he considered to be related to the Prokhorovka culture and, in general terms, to the group of the 'transitional period' in the south of Russia which date to the 3rd–2nd or even 2nd–1st centuries BC. [27] B.N. Grakov dated the kurgans of Prokhorovka to the 3rd–2nd centuries BC.[28] Later still, M.G. Moshkova dated the Prokhorovka cemetery from the turn of the 4th/3rd to the beginning of the 3rd centuries BC on the basis that the silver bowls were generally limited to the end of the 4th–2nd centuries BC.[29] Due to the trend in the 1980s for the chronology of the material culture of the Scythians of the northern Pontic region to be raised, the same should be applied to the chronology of Sarmatian culture in the lower Volga and southern Urals and this was indeed established by P. Rau on the basis of very late datings of Scythian monuments that he was aware of.[30] Guided by these considerations, I examined the complexes of the Prokhorovka cemetery and attributed them to two separate phases. The first includes kurgans 3 and 4 and, according to their funerary rites and composition of artifacts which are Sauromatian, I dated them to the 5th to 4th centuries BC and attributed this phase to the Sauromatian period. This deprived Prokhorovka culture of archaic features such as stone dishes, items of 'Animal Style', bronze arrowheads and a number of pecularities of the funeral rite. The second phase includes kurgan 2 which I dated no later than the 4th century BC. I found it difficult to determine the dating age of kurgan 1, since the analogies to the artifacts found there belonged to a very wide period extending from the 4th to the 1st centuries BC. In further considering the essence of the chronology of this culture, I concluded that it covered a broader time-frame, beginning in the 4th or possibly 5th century BC and lasted as late as the 1st century BC inclusive. B.N. Grakov and K.F. Smirnov wrote about the latter and A.S. Skripkin confidently demonstrated this on the basis of reliably dated complexes;[31] I.V. Sergatskov even went to suggest that it lasted as late as the 1st century AD.[32] I

[24] Alekseeva 1975; 1978; 1982.
[25] Bidzilya and Polin 2012: 380–86, 465–71.
[26] Ostroverkhov 1985: 93, 97–107.
[27] Rostovtseff 1918: 79; 1925: 611–12.
[28] Grakov 1928: 152–54.
[29] Moshkova 1963: 8; 1974: 11.
[30] Rau 1929.
[31] Grakov 1928: 152–54; Smirnov 1959: 318; cf. Skripkin 1987: 231; 1990: 170; 2000: 146; Klepikov, Skripkin and Sergatskov 2008: 57.
[32] Sergatskov 2000: 152.

also emphasised that dating the Prokhorovka culture monuments to the 3rd to 2nd century BC was highly problematic and insisted that it was impossible to place the bulk of the known Prokhorovka monuments within this period. One cannot assume the peak development of Prokhorovka culture during this period was the result of a population explosion and it appears that monuments of the Prokhorovka culture in this period were very few.[33]

My conclusions were accepted and developed by V.Yu. Zuev, who unequivocally accepted the division of the Prokhorovka burial ground into two. The northern part, which included kurgans 3 and 4, he dated from the second half of the 5th to the turn of the 5th to 4th centuries BC and correlated it with the Sauromatian culture of the southern Ural region, which was proposed to be called Filippovka after the famous Filippovka kurgans in the southern Urals investigated by A.Kh. Pshenichnyuk in 1986–1990.[34] The southern part, consisting of kurgans 1 and 2, he dated to the turn of the 2nd/1st century or more likely the beginning of the 1st century BC. He also noted the complete absence of Prokhorovka culture monuments of the 3rd to the first half of the 2nd centuries BC and proposed his periodisation for the monuments of the southern Ural region, according to which the monuments of the 5th–4th centuries BC belong to the Filippovka culture, which terminated at the turn of the 4th/3rd centuries BC. V.Yu. Zuev suggested dating the Prokhorovka culture mouments to the last third of the 2nd and 1st centuries BC.[35] My proposal to specify the dating of the Prokhorovka kurgans in general was accepted, but the new periodisation of the Sarmatian culture proposed by V.Yu. Zuev based on the datings from the Prokhorovka kurgans was met with protest and categorically rejected. The main thesis of his opponents was that the Prokhorovka culture existed continuously, and there was no hiatus in 3rd–first half of 2nd century BC as 62 complexes of the 3rd century BC were identified in the lower Volga region in 'the completely logical way'.[36]

What do the new excavations of the Prokhorovka kurgans offer? In 2003–2005 kurgans 1–4, which had been partially excavated by S.I. Rudenko in 1916, were re-investigated. A series of new intrusive burials were discovered and additional kurgans were also investigated which S.I. Rudenko had numbered but not excavated: kurgans 'Б' ('hillfort'), 'а' (which appeared to be empty), 'б' and 'в'. The objects found previously, as well as those found in these new excavations, were generally placed by L.T. Yablonsky between the second half of the 4th century, possibly the turn of the 4th/3rd century, and the first half of the 2nd century BC. This appears to have been a deliberate retort to the earlier chronological classification by V.Yu. Zuev, judging by the edifying and instructive conclusion addressed to him and twice repeated almost verbatim on pp. 82 and 359: 'Attempts to audit traditional for the domestic archeology concept of chronology and periodisation of the Sarmatian culture, primarily with the use of materials from Prokhorovka, are ill-conceived, completely unreasonable, adventuristic and indefensible from the point of view of the total set of archaeological scientific data'.[37] However, even if V.Yu. Zuev is incorrect in some aspects,[38] this does not mean a refusal to clarify and revise a number of statements in the chronology of Savomatian and early Sarmatian culture, which, due to the remoteness of the Volga–Ural region from the ancient centres of civilisation, have very little reliable chronological indicators as there are few closely dated imports. Apparently, in order to try to completely cut off the dating of the Prokhorovka kurgans by V.Yu. Zuev, and attempting to show the continuity of the Prokhorovka culture development and absence of any hiatus in the 3rd–early 2nd centuries BC, L.T. Yablonsky defined a very truncated chronological span for the Prokhorovka burial ground, namely between the end of the 4th and first half of the 2nd centuries BC.

The date of the famous Prokhorovka burial 1 in kurgan 1 with its iron cuirass, ceremonial sword, gold torc and other items is limited by the dating of the newly excavated intrusive burial 4. In this grave a long sword with a slightly curved crescentic pommel and massive straight guard was found, as well as two daggers with slightly curved pommels and straight guards, and 60 bronze arrowheads.[39] According to the combination of these features, the date of this intrusive burial is limited to the 4th century BC, thus narrowing the date of the primary burial 1. The remaining five intrusive burials do not contain such clearly defined dating evidence as their grave-goods have very wide chronological parameters from the 4th–1st centuries BC. The proposed dating of kurgan 1 'by the time from the end of 4th and not later than the 3rd century BC' seems too narrow as a combination of items from the 4th century BC is present on the one hand, and there are no restrictions on the late frontier in dating until the 2nd–1st century BC, on the other hand. As for the dating of burial 1, there is one more point which should not be overlooked. V.I. Mordvintseva drew attention to the presence of three pairs of holes around the edges of the silver *phialae* and proves they had been re-used as phalerae decorating horse harness. That author went on to date burial 1 in the Prokhorovka kurgan 1

[33] Polin 1987: 132; 1992: 74–80.
[34] Pshenichnyuk 1989; 2001: 26–37.
[35] Zuev 1998*b*: 16-19; 1999: 306–307; 2000*a*: 310–27.
[36] Skripkin, Klepikov and Moshkova 2002: 101–11.
[37] Yablonsky 2010: 62, 359–60.
[38] But far from being everything, his constructions contain enough rationale that it would be worthwhile to adopt: Zuev 2004.
[39] Yablonsky 2010: 58–59, 72–75, figs 41.9–11, 45, cat 12–72a, 73–78.

to the 3rd century BC, thus the Prokhorovka phalerae prove to be the earliest known, as all other such finds date no earlier than the end of the 3rd–2nd century BC (Fedulovsky treasure, st.Uspenskaya, hut.Verhniy, Vasyurina hill), and the majority of finds in fact date from the 2nd–1st centuries BC and later.[40] After the discovery by L.T. Yablonsky in kurgan 1 of the intrusive burial 4, which can be reliably dated to the 4th century BC, the dating of the central burial 1 with its phalerae is placed in the 4th century BC and the time lapse between the date of the Prokhorovka phalerae and the early group of finds of phalerae in the Sarmatian world occupies at least a century. This all suggests there may have been a later burial of the 2nd or 1st century BC which had intruded into the centre of the kurgan, destroying the primary 4th century BC burial in kurgan 1, and resulting in a mixed set of artifacts with analogies covering the period from the 4th century BC until the 1st century AD. Perhaps V.Yu. Zuev was not so wrong? In any case, the possibility cannot be excluded.

During illegal excavations of burial 1 in kurgan 2 in 1911, a dagger with a straight pommel and guard and an H-section hilt was found, and is typical of the 4th century BC; a spear tip belongs to a type characteristic of the 6th–4th centuries BC. This date-range is confirmed by the dating of intrusive burial 2 to the 4th century BC, in which a long sword with a straight pommel and massive straight guard, also with an H-section handle, was found, accompanied by a quiver set of 40 bronze socketed arrowheads and one iron petiolate arrowhead. Four other intrusive burials in this kurgan contained grave-goods dated within the 4th–1st centuries BC. The researcher suggested dating burial mound 2 to the 4th–3rd centuries BC, emphasising that 'burials of the kurgan 2 have no signs of the 2nd–1st century BC',[41] but this is a conclusion with which we cannot agree.

In kurgan 3, whose burial 1 I had proposed to date to the 6th–5th centuries BC based on the finds from the old excavations, and the burial structure which is typical of the Sauromatian period, two intrusive burials were also found. Burial 2 confirmed this date as it contained a sword with a massive straight bar-shaped pommel and a butterfly-shaped guard of 5th–4th century BC type. It was accompanied by massive bronze arrowheads, also typical of this period. In the proposed dating of the kurgan 3 to the turn of the 5th/4th to 3rd centuries BC,[42] the later limit was unjustifiably extended and it would be more appropriate to narrow the dating to the 4th century BC. A fragment of a stone dish with a decorated rim and a large mirror with a flat handle were found with burial 1 in kurgan 4 in debris left by earlier tomb-robbers and excavations by S.I. Rudenko. I have previously dated this burial to the 5th–4th centuries BC on the basis of the characteristic large pit with a step on one side. There are also two intrusive burials, whose assemblages can be placed within the 4th–1st centuries BC, thus it is hardly worthwhile to limit ourselves to the dating of the whole kurgan to the 4th–3rd centuries BC.[43]

Interesting data were obtained from the new kurgans of the Prokhorovka cemetery which were first investigated in 2003–2005. Kurgan 'Б' ('hillfort') contained three burials, of which the most interesting is burial 3. There was found a silver bowl of Macedonian production, a spearhead, golden overlays of a bowl and a number of other golden ornaments, a quiver set containing 111 iron petiolated arrowheads and one bronze socketed arrowhead, a large bronze mirror, an iron zoomorphic quiver-hook plated with gold, alabaster and beads, etc. The proposed date of this burial is between the third quarter of the 4th and first half of the 3rd centuries BC. However, the vast majority of objects have analogies within the 4th century BC. There are items limiting the dating, as the silver cup, the dating of which is determined to be within the second half or even the third quarter of the 4th century BC, the gold overlays of the bowl and the tip of the spear. The latter, as already noted, are practically absent in complexes later than the 4th century BC. For dating of bowls with golden overlays in the southern Urals, the set of bowls from Filippovka kurgan 1,[44] which is dated to no later than the end of the 5th and first half of the 4th century BC, is decisive. According to the finds from Scythia, the later bowls with golden overlays are found in complexes dating no later than the third quarter of the 6th century BC,[45] including a burial at Novocherkassk in the lower Don region which was connected with the 'nomads of the eastern appearance'.[46] Accordingly, the overlays from Prokhorovka kurgan 'В' are dated no later than this period, which is the maximum date of burial 3 of kurgan 'Б', with a reserve dating to the second half of the 4th century BC. Burial 1 is synchronised with burial 3 through the discovery of small gold decorative pieces, whereas burial 2 contains no grave-goods.[47]

Kurgan 'б' contained from 11 to 14 burials,[48] located in a dense cluster and possibly arranged in three rows. The author considered all to be closely related in time, and dated the kurgan between the end of the 3rd and first half of the 2nd centuries BC,[49] but this is not confirmed by the topography of the burials or

[40] Mordvintseva 1996: 155–59; 2001: 63, 68, 71–73.
[41] Yablonsky 2010: 42–46, 75–77, cats 83–84, 87–130.
[42] Yablonsky 2010: 31–34, 77–78, cats 185–294.
[43] Yablonsky 2010: 25–28, 79, cats 279–346.
[44] Korolkova 2001: cats 29–90.
[45] Bidzilya and Polin 2012: 409–13.
[46] Glebov 2012: 28; Dedyulkin 2015: 72.
[47] Yablonsky 2010: 15–24, 68–72, cats 347–1283.
[48] On p. 47 in kurgan 'b', 13 burials were mentioned, on p. 80 there were 11, yet in the report on pp. 47–54 as many as 14 burials are described (Yablonsky 2010).
[49] Yablonsky 2010: 46–54, 80–81, cats 1296–1552.

their dates. In kurgan 'б' the cases of cutting previous burials by successive ones, with complete destruction in the case of burial 11, instead indicate a considerable temporal diversity of burials, and this is confirmed by their individual dating. Thus, apparently burial 2-b is relatively early in the kurgan. An archaic ornamented round-bottomed vessel with an admixture of talc in the clay which was found here dates to the 4th or possibly 5th–6th centuries BC. The dagger from burial 4 with a slightly curved crescentic pommel and arcuate guard clearly dates to the 4th century BC, which does not contradict the date indicated by a quiver set of four bronze socketed arrowheads and 12 iron petiolated ones. In burials 2 and 9, daggers with ring pommels were found, the earliest analogies of which are reliably dated no earlier than the 2nd–1st centuries BC. The occurrence of swords with ring or crescentic pommels, accompanied by exclusively iron petiolated arrowheads, excludes a date prior to the 2nd century BC, and most date from the 1st century BC and later.[50] The remaining graves of kurgan 'б' have an unremarkable inventory broadly datable to within the 4th–1st centuries BC, and perhaps wider still. Thus, in general, the date-range of kurgan 'б' covers the 4th–1st centuries BC. The kurgan 'б' contained three burials which, according to the fair definition of L.T. Yablonsky, did not give an exact dating. And so the attempt to synchronise the burial 3 from the kurgan 'в' with burial 7 from the kurgan 'б', and date both to the 3rd–2nd century BC on the basis of crushed bone additive in the pottery fabric from each burials, is hardly successful since both burials are undated.[51]

Summarising the review of the chronology of the old and new kurgans of the Prokhorovka cemetery, it should be noted that the range is still very wide and covers the period from the 6th or end of the 5th century until the 1st centuries BC, thus almost the entire period recently allocated for the early Sarmatian Prokhorovka culture.[52] Such a lengthy use of kurgans by newly arrived groups of nomads is, according to observations made by K.F. Smirnov, typical of the southern Urals.[53] However, filling the interval between the 3rd and the beginning of the 2nd centuries BC is questionable for this site, as it is for others. Most likely, there are burials from this interval but it is difficult to prove their date. Of course, one can limit the dates and using a logical method assign the necessary periods for burials but such arguments as 'most likely 3rd century BC', 'may be 3rd century BC', 'cannot be dated later than the 3rd century BC', 'does not exclude the 3rd century BC' hardly convince. The failure of such a method of 'limited dating ages' was perfectly demonstrated by S.V. Demidenko: the re-analysis of as many as 60% of the burials of the lower Volga region which were said to be 'trapped' in the 3rd century BC proved that none were earlier than the 2nd–1st centuries BC.[54] So the notorious 'problem of the 3rd century BC' still remains topical for the Prokhorovka cemetery, as well as for the entire Volga–Ural region.

3rd century BC chronology

Significant progress was made in solving the problem of the 3rd century BC in the northwest Pontic region. Here, from 1995 to 2012, archaeologists from Tirapol (Ye.V. Yarovoy, I.A. Chetverikov and V.S. Sinika) renewed and successfully completed excavations of the large kurgan burial ground near the village of Glinoye, in the lower Dniester region, which was previously known only from poorly documented excavations by I.Ya. and L.P. Stempkovsky in 1896–1910.[55] In recent times, 115 Scythian kurgans of the 3rd–2nd centuries BC, possibly extending as late as the beginning of the 1st century BC, were excavated and found to date to a period unrepresented elsewhere in Scythia. These kurgans continue the earlier Scythian traditions of funerary rites and the main features of material culture of the 5th–4th centuries BC and, in general terms, belong to the same Scythian cattle-breeding semi-nomads who had previously occupied relatively large settlements on the Dniester river.[56] They differ sharply from the strictly sedentary agricultural late Scythian population of the lower Dnieper and Crimean foothills, proving the survival of former Scythian culture in the lower Dniester region, possibly extending as far as the lower Danube, during the 3rd–2nd centuries BC.[57]

Numerous finds of characteristic horse bronze lamellar ornaments in the kurgans from Glinoye allowed Yu.P. Zaitsev to resolve the question of identification of the so-called 'strange complexes' with these items, and reliably equate them with later Scythians of the 3rd–1st centuries BC. Yu.P. Zaitsev clarified the chronology of what he preferred to call the 'votive–ritual complexes', determined their area and identified groups of the 3rd–2nd and 2nd–1st centuries BC through associated pottery imports. Based on the distribution of these finds, this scholar concluded that during the 3rd–2nd centuries BC vast unpopulated territories of the steppe northern Pontus nominally belonged to the later Scythians and were controlled by them, and bordered contemporary funerary complexes to the south. In his opinion, such votive–ritual complexes in the unpopulated territory of the steppe and forest-steppe between the Volga and the Dniester rivers marked the main communication routes.[58]

[50] Skripkin 2005: 171–85.
[51] Yablonsky 2010: 28–31, 81, cats 1553–55.
[52] Klepikov, Skripkin and Sergatskov 2008: 50–61.
[53] Smirnov 1975: 156–57.
[54] Demidenko 2007: 51–53.
[55] Melyukova 1962.
[56] Fidelsky 2012; Ivashchenko 2012.
[57] Telnov, Chetverikov and Sinika 2012: 5–15.
[58] Zaitsev 2012*a*; 2012*b*.

After many years of field research by N.A. Gavrilyuk and V.P. Bylkova, the chronology of the Scythian lower Dnieper settlements and hillforts within the Zaporozhye and Chersonesus regions has been clarified. Scythian settlements during the existence of Pontic Scythia date to the 4th century BC, and only the Kamenskaya hillfort survived until the beginning of the 3rd century BC. Thus, according to these authors, there is not a single shred of credible evidence for a concentration of Scythian population in the lower Dnieper valley during the 3rd and 2nd centuries BC. Here were found fragments of the biconical amphorae of Phasos, Heracleia (including non-stamped ones),[59] Bosporus (such as Solokha-I and Solokha-II), Chersonesus (including the handle with the stamp of astynom Xenon), Chios straight amphorae with a cap-foot, early Sinope amphorae (including the stamp of the astynom Phylocrat), those of Kos with double-barreled handles, and that of Mende of Melitopol type.[60]

All of the amphora types found at Scythian settlements in the lower Dnieper region during the period of the existence of the Pontic Scythia, and listed in the publications by N.A. Gavrylyuk, V.P. Bylkova and S.N. Kravchenko, are firmly dated to the 6th century BC. To date, the Phasos biconical amphorae are dated from the third quarter of the 6th to the end of the 5th century BC, the Heracleian ones to the end of the 5th to the beginning of the 3rd century BC, Solokha I and II (Peparet) to the first to third quarters of the 4th century BC, Chios with cap-foot to the end of the 5th to third quarter of the 4th century BC, and Sinope amphorae of the early types date to the second quarter of the 6th century BC. Astynom Phylocrat is not listed among the Sinope astynomes and it appears that the inscription was incorrectly translated.[61] The Bosporan amphorae are recently defined as Icos products of the end of the first to third quarter of the 6th century BC.[62] The Chersonesus astynom Xenon belongs to the group I–G according to V.I. Kats, who dates it to the first decade of the 3rd century BC.[63] Taking into consideration the discovery of Chersonesus stamps of the first and second groups, according to V.I. Kats' classification, among finds from the funerary feast of the Alexandropol kurgan, the beginning of the Chersonesus stamps should be shifted to 350 BC,[64] and the dating of Xanthos lay within the second half of the 4th century BC. Kos and pseudo-Kos amphora of types I and II according to S.Yu. Monakhov, both with single and double-barreled handles, were produced during the entire 4th and beginning of the 3rd centuries BC.[65]

According to N.A. Onayko, antique pottery of the 3rd–2nd centuries BC was found in the lower Dnieper settlements and hillforts at 20 locations.[66] As V.P. Bylkova revealed after careful study of these materials, all of these datings should be adjusted. From all the amphorae proposed by N.A. Onayko to be dated to the 3rd–2nd centuries BC, only a single Sinope stamp remains.[67] This belongs to group V-E of the beginning of the 2nd century BC, according to N. Konovichi, or VII-A from 215–190 BC, according to the classification of V.I. Kats.[68] It was found in the area of Ushkalka village and not associated with any particular monument. Moreover, it should be mentioned that individual finds of fragmentary Rhodian amphorae with the stamps of Ainosimidus II eponym from the late Scythian sanctuary in the group of Ryadovye kurgans near Krivoy Rog, and a stamped handle near Kushugum in Zaporozhye region, date to the end of the 3rd or beginning of the 2nd century BC.[69] A stamp of Archilaid eponym, dated to the first quarter of the 2nd century BC, originates from Kapulovskaya from the collections of A.V. Bodyansky, another of Agatobul ergasteriarch dated to the second half of the 2nd century BC was pulled from the Dnieper in the vicinity of Kamenskaya hillfort.[70] According to V. Bylkova, the Scythian settlements of the preceding period had terminated no later than the end of the first third of the 3rd century BC, and for a long time this territory remained empty. In the lower Dnieper region, no cultural layers or objects dating to the 3rd century BC have been found at any Scythian or late Scythian settlements or hillforts. Only in the second half of the 2nd century BC was the late Scythian hillfort founded at Znamenka, that at Gavrilovka founded at the end of the 2nd–1st century BC, those at Annovka and Velikolepetiha founded at the turn of the 2nd–1st centuries BC, settlements in the Zolotaya Balka and Lyovo, as well as Lyubimirovka, Kairy, Krasnyi Mayak and Nikolaevka (Kozatskoe), established in the 1st century BC, and finally hillforts at Gornostaevka, Konsulovka, Sablukovka, Poniatovka and Staroshvedskoe founded in the 1st century BC – 1st century AD.[71]

Against this background, it is strange to read the statement made by N.A. Gavrilyuk that 'in the 3rd century BC life continued on the Dnieper right-bank settlements', as she herself has pointed out the absence

[59] Unfortunately, the complex of amphorae stamps of the Lysaya Gora settlement remained unpublished. A promised special publication has never appeared.
[60] Gavrilyuk, Bylkova and Kravchenko 1992*a*: 29–31, 34–35; 1992*b*: 7, 14, 22–23, 26; Gavrilyuk 2013: 132, 161–84.
[61] Monakhov 2003: 20–22, 28–29, 56–76, 96–99, 101–10, 123–44, 146–51; Bidzilya and Polin 2012: 571. The reference to N.F. Fedoseyev's identification is incorrect as he did not define this stamp (pers. comm.) and there was no such astinomus in his classification.
[62] Monakhov and Fedoseyev 2013; Monakhov and Kuznetsova 2009.
[63] Kats 2007: 442.
[64] Polin 2010: 278–79, 286–88.
[65] Monakhov 2014: 202–11.
[66] Onayko 1970: nos 29–34, 38, 40–45, 71–74, 77–88, 95–105, 132–34, 215–32, 239–40, 266–67, 359–75.
[67] Onayko 1970: no. 87.
[68] Kats 2007: 411, no. 166.
[69] Polin 2014: 635.
[70] Pleshivenko 1991*b*: 165, table 3, II; 2000: 229, table 6.12.
[71] Bylkova 2007*a*: 17–18, 109–14; 2007*b*: 91–97.

at as many as 106 Scythian settlements of the 4th century BC, of any materials later than this date, and only the Kamenskaya hillfort survived until the first quarter of the 3rd century BC. To support her idea of continuing life in the 3rd century BC, she provided materials of 'Hellenistic time', including amphorae of Peparet I type, Chios cap, Phasos biconical, Heracleia and Sinope found in the Zolotaya Balka settlement, Sinope ones of Solokha I and II type and the Phasos biconical amphorae at the Annovka hillfort, i.e., the same types listed above, which served her to date the Scythian settlements to the 4th century BC.[72] The only type of amphora, incorrectly placed among those of the early Hellenistic period, was the late Kos type found at Annovka hillfort and Zolotaya Balka settlement, and dated by M.I. Vyazmitina to the 2nd–1st centuries BC,[73] or instead to the 1st century BC–1st century AD by I.B. Zeest.[74] According to S.Yu. Monakhov this is the fifth type of Kos amphorae dating between the 3rd and 1st centuries BC.[75]

These amphorae have nothing to do with the Hellenistic ones, and instead relate to the period of existence of the late Scythian hillforts. It is also incorrect to use the Chersonesus stamps from Annovka hillfort to confirm its dating to the 3rd–2nd centuries BC. A partially impressed Chersonesus fluted stamp is attributed to the astynom Apoll and, by reference to V.V. Borisova, is dated to the end of the 3rd or 2nd century BC.[76] But this is an error twice over. In the catalogue of V.V. Borisova, the Apoll stamp is dated to the end of the 4th and beginning of the 3rd centuries BC.[77] In addition to this confusion, the stamp was restored incorrectly but, thanks to the album of V.I. Kats which contains drawings of Chersonesus stamps, it is not difficult to restore the stamp of the astynom Batilla,[78] which is included in group I-Б of the last quarter of 4th century BC according to V.I. Kats, the dating of which, as already noted above, should be extended to the third quarter of the 4th century BC thanks to a find in the Alexandropol kurgan funerary feast.[79] Thus, the Chersonesus stamp from Annovka hillfort was not related to its late Scythian period, but instead belonged to the Scythian settlement of the preceding period of the 4th century BC.

It is even more surprising to read an indiscriminate statement, without any supporting data, that all dates proposed by V.P. Bylkova for late Scythian sites of the lower Dnieper region are incorrect: I wish to state categorically that the excellent knowledge of ancient material and the high qualification of V.P. Bylkova, confirmed by years of successful fieldwork and numerous published papers, do not give any reason to doubt her conclusions. The proposal by her that datings of late Scythian sites were based on a comprehensive analysis of the available materials,[80] in contrast to the datings proposed by N.A. Gavrilyuk, based on the mechanical summation of reliable and erroneous dating ages of finds. N.A. Gavrilyuk also claims that V.P. Bylkova based her reasoning on the lack of finds of Rhodian stamps, but this is untrue since in the works of V.P. Bylkova all evidence for finds was carefully analysed. Rhodian stamps, according to N.A. Gavrylyuk, were found at the Kapulovskaya hillfort and the settlement of Lysaya Gora with reference to repositories of Zaporozhye Museum,[81] but she did not mention these stamps in her own publications.[82] Instead, the above-mentioned Rhodian stamps, one from Kapulovka dating to the first quarter of the 2nd century BC and another to the second half of the 2nd century BC from the Dnieper near the Kamenka hillfort, prove the dating and conclusions made by V.P. Bylkova.[83] Thus, in the lower Dnieper region, a long break has been detected between the Scythian settlements of 'Great Scythia', which had terminated no later than the first quarter of the 3rd century BC, and the late Scythian settlements of 'Scythia Minor', which began to emerge in the second half of the 2nd century BC.

Over the past years, enormous work has been done on the study of sites of the late Scythian period in the Crimea but unfortunately the equivalent early period of Scythian sedentary life remains poorly studied here. A few very poorly-studied Scythian settlements pre-date the 4th–3rd centuries BC, and traces of these have been found at all of the major late Scythian hillforts in the Crimea, including Bulganakskaya and Kermen-Kyr. Several settlements were also discovered on the steppe plain in the central Crimea.[84] However, there is much more information from the southeast and eastern Crimea, where over 60 Scythian settlements dating between the end of the 5th and first third of the 3rd centuries BC are found in the vicinity of Theodosia and up to the eastern Syvash, the large system of putrid lagoons on the western side of the Azov sea.[85] Moreover, there are about 300 barbarian settlements dating from the end of the 5th to the first third of the 3rd centuries

[72] Gavrilyuk 2013: 535–38; Gavrilyuk, Bylkova and Kravchenko 1992*a*: 29–31, 34–35; 1992*b*: 7, 14, 22–23, 26.
[73] Vyazmitina 1962: 154, figs 71, 11–12.
[74] Zeest 1960: 109, table XXVII, 61–62.
[75] Monakhov 2014: 214, fig. 12.
[76] Gavrilyuk and Abikulova 1991*a*: 22, fig. 19.1.
[77] Borisova 1974: 112, no. 11, table II.2.
[78] Kats 1994: table XIII.1-32.1–1-32.4. To my delight my restoration of the stigma made while writing this paper fully confirms the restoration made earlier by V.P. Bylkova (2007*a*: 95).
[79] Kats 2007: 422.
[80] Not only from the repositories of the IA NASU and the Chersonesus Local History Museum, but also from the collection of the Moscow State University.
[81] Gavrilyuk 2013: 537, n. 123.
[82] Gavrilyuk 2013: 154, 184; Gavrilyuk, Bylkova and Kravchenko 1992*a*: 29; 1992*b*: 7, 14, 22–23, 26.
[83] Pleshivenko 1991*b*: 165, table 3, II; 2000: 229, table 6.12.
[84] Gavrilov and Shonov 2004: 89; Koltukhov 2004: 218–19.
[85] Gavrilov 2004*a*: 137; 2004*b*: 339–40.

BC in eastern Crimea.[86] A chronological gap has been detected between hillforts which ended at the beginning of the 3rd century BC, and late Scythian hillforts which emerged at the end of the 3rd or beginning of the 2nd centuries (or the turn of the 3rd–2nd centuries BC) in the Crimean foothills,[87] where by that time there existed more than a dozen late Scythian sites: Kermen-Kyr, Pionerskaya, Brusilovo (Beki-Eli), Mazanskaya, Borut-Khane, Melovoye, Burundukskaya, Sary-Kaya, Bor-Kaya-1, Kuru-Bash, Razvilka, Bulganakskaya. There are more than 50 hillforts and sanctuaries dating from the 3rd/2nd centuries BC to 3rd century AD in eastern Crimea, many accompanied by contemporary unfortified settlements.[88] The problem of the date of foundation of Scythian Neapolis is finally solved as the cultural layer of the 4th century BC appears to be related to the settlement of the Kizil-Koba culture, or preceding Scythian period:[89] it does not relate to the fortified city of Scythian Neapolis, the foundation of which is confirmed by numerous finds to date to the second quarter or middle of the 2nd century BC.[90]

Particular attention should be paid to the late Scythian hillfort of Ak-Kaya (Vishenoe) near Belogorsk, investigated from 2005–2014, which was founded at the end of the 4th century BC and continued until the 3rd century BC, with associated kurgan burials of the 3rd–2nd centuries BC. The capital role of this site is assumed at the initial stage of the late Scythian history in the 3rd to early 2nd century BC not only for the Crimea, but also for the entire late Scythian northern Pontic region, which in the middle of the 2nd century BC passed to Scythian Neapolis.[91] This is the only monument in the Crimea which overlaps the lacuna of the 3rd century BC.

Conclusions

The role of Sarmatians in Crimean events of the 3rd century BC are widely assumed, for instance in the destruction of the settlements of Chersonesus and along the European part of the Bosporus with distant raids as far as the Don. Their occupation of the northern Crimea is placed within the first half of the 2nd century BC, from where, as allies of Chersonesus, they were supposed to have made punitive raids on late Scythians in other territories.[92] The basis for this include the following documents:

- the Chersonesus decree 'On carrying Dionysus' from the end of the first quarter of the 3rd century BC, the restoration in which the ethnonym 'Sarmatians' is more than problematic;
- the legend about Amaga, which has an excellent context, in the absence of any chronological references;
- the peace treaty of the Pontic king Pharnac I in 180/179 BC when Chersonesus and the Sarmatian king Gatal are mentioned.

However, there is no link between the latter and the context of the treaty, and the activities of Gatal are more evidently associated with the territory of Kuban and the northern Caucasus in general.[93] The first reliable historical evidence of the arrival of the Sarmatians in Crimea is the decree in honour of Diophantus, dated to 110/109 BC, which mentions the Revksinali-Rhoxolani among the allies of the late Scythian king Palaka. Apparently, the first invasion of the Sarmatians to Crimea resulted in their heavy defeat and discouraged them from raiding here again. Moreover, there are no Sarmatian burials of this period in Crimea.[94] A.E. Puzdrovsky considers it possible to place the first stage of penetration by Sarmatians into Crimea at the end of the 2nd or the 1st centuries BC.[95] However, the archaeological data indicate that this incursion instead begins later, between the 1st century BC and 2nd century AD, and even then is archaeologically represented by only a dozen burials with poor burial assemblages, although admittedly a number of Sarmatian burials of this period are known from the Crimean foothills,[96] including the famously rich burial of a Sarmatian lady in the Nogaychi kurgan dating to the 1st century BC.[97] Beginning in the mid-1st century AD, and continuing thereafter, there is a significant and steadily increasing number of Sarmatian side-wall under-cut burials added to late Scythian cemeteries in the Crimean foothills.[98]

A significant decline in Scythian field studies in the northern Pontic region was observed in the last quarter of the century. Excavations of Scythian kurgans became spasmodic: only G.N. Toshchev, who has been excavating the massive Mamai-Gora cemetery in the Zaporizhzhya region for almost 30 years, continues successfully, and so far about 300 Scythian kurgans containing more than 400 burials of the 5th–4th centuries BC have been investigated. In addition, several kurgans of the higher Scythian nobility, such as Soboleva Mohyla and the kurgan 13 near the town of Ordzhonikidze in the Dnepropetrovsk region, the Bratolyubovsky kurgan in

[86] Kruglikova 1975: 256–77; Maslennikov 1998: 72–88; Koltukhov 2004: 220–30.
[87] Puzdrovsky 1999: 212; 2007: 78, 87.
[88] Koltukhov 1999: 18–21; Smekalova, Koltukhov and Zaitsev 2015: 8, 99, 105–108, 131–34, 146, 151, 154, 162–64, 177–80, 201–205, 218, 223, 228, 234.
[89] Khrapunov 2004: 82–83.
[90] Zaitsev 2003: 21, 41–42.
[91] Zaitsev 2013: 500–501; 2014; 2015; Zaitsev and Koltukhov 2016: 124–25.
[92] Puzdrovsky 1994: 397; 1999: 209–10; 2001: 87, 90; Koltukhov 1999: 81; Khrapunov 2004: 125.
[93] Polin 1992: 90–94; Marchenko 1996: 24–127.
[94] Simonenko 1993: 116; Khrapunov 2004: 126, 141.
[95] Puzdrovsky 1999: 216.
[96] Simonenko 1993: 67–75; Khrapunov 1995: 71; 2004: 126–29; Puzdrovsky 2007: 40–43.
[97] Zaitsev, Mordvintseva and Hellström 2013: 51.
[98] Khrapunov 2004: 129–42; Puzdrovsky 2007: 87, 165.

the Chersonesus region, have been investigated. Re-excavation of Chmyreva Mogila in the Zaporizhzhya region was carried out,[99] excavations on the Besh-Oba IV kurgan in Crimea,[100] additional investigation of the Ryzhanovka kurgan and excavations of the Skifskaya Mogila in the Cherkassy region,[101] excavations of the Bliznets-2 kurgan in the city of Dnepropetrovsk.[102] The re-investigation of one of the main Scythian monuments, the royal Alexandropol kurgan in the Dnepropetrovsk region, is particularly important in this respect.[103] Over the years, materials of excavations of a number of key kurgans of the highest Scythian nobility were published, such as Babina, Vodyana and Soboleva Mohylas,[104] Gaymanova Mogila,[105] Ryzhanovka and Bratolyubovsky kurgans,[106] the Zolotaya Balka kurgans.[107]

The fundamental research by V.I. Kats, N.F. Fedoseyev, A. Avram, N. Konovichi, I. Garlan and G. Finkielsztejn on stamped amphorae found at Chersonesus, Heracleia, Phasos, Sinope, Rhodes and other centres have been vital for Scythian studies over the past years.[108] Of particular interest are the monographs and significant articles by S.Yu. Monakhov detailing the typology of these amphorae, the identification of their production centres, and the dating of certain types and series, with the publication of many amphora assemblages from Scythian kurgans in the northern Black Sea region.[109] On this basis, it has been possible to re-date a number of previously excavated kurgans, as well as more recently investigated examples, the latter including Babina, Vodyana and Soboleva Mohylas, Zolotaya Balka kurgans: the result has been a new series of reliably dated kurgans.

In the full publication of the Gaimanova Mogila, all of the burials were dated to within the first half of the 4th century BC, in contrast to the previously proposed dating of this kurgan to the third quarter of the 4th century BC. Based on these materials, a group of Scythian royal kurgans dating to the second quarter to middle of the 4th century BC was identified, which allowed the construction of a scheme demonstrating a continuous Scythian tradition of construction of royal kurgans from the time of Scythia described by Herodotus in the mid- or third quarter of the 5th century BC until the third quarter of the 4th century BC. Chronological stages of Scythian kurgans were identified which date respectively from the second quarter to second half of the 5th century BC, the first half of the 4th century BC, the third quarter of the 4th century BC, and the end of the third quarter of the 4th to beginning of the 3rd centuries BC. After the discovery by Tiraspol archaeologists of the burial ground in Glinoye, it finally became possible to add a group of Scythian kurgans dating from the 3rd–2nd centuries BC.[110]

The finds from the near-kurgan funerary feast found during the most recent excavation at the Alexandropol kurgan from 2004 to 2009 allow us to more precisely date this important Scythian monument to 340–330 BC. This date was obtained thanks to the refinement of chronology of individual types of amphorae, as well as the identification of chronological horizons of stamped and non-stamped amphorae investigated by Yu. Monakhov: the finds of stamps of the first and second groups of Tauric Chersonesus, Heracleian stamps of the late group and late-type Phasos stamps enable us to attribute the beginning of the Chersonesus branding to the middle of the 4th century BC, as well as dating the above-mentioned stamps from other centres to 340–330 BC.[111] The accumulation of materials from the funerary feasts of the Scythian kurgans also make it possible to raise the date of the final early-type Phasos stamps and limit it to the second quarter of the 4th century BC, as well as dating the beginning of the late Phasos stamps to around 350 BC, and identifying the earliest group of late Phasos stamps to the third quarter of the 4th century BC.[112]

Pottery imports found in all kurgans of steppe Scythia, from the Don to the Danube, as well as the kurgans of Scythian nobility and those of ordinary people, were analysed, taking into account the probable corrections in the dating of the stamps of Heracleia, Phasos and Chersonesus according to the research by E.Ya. Rogov and I.V. Tunkina on different types of black-gloss pottery and groups of stamped and non-stamped amphorae found in Greek cemeteries in the northern Pontus.[113] As a result, the following chronological groups were identified:

a. 5th century BC, mainly the middle and second half of the century (168 kurgans and burials);
b. first half of the 4th century BC (374);
c. middle and third quarter of the 4th century (286);
d. second half of the 4th to the beginning of the 3rd century BC (57);
e. 19 burials and the so-called ‘strange complexes’ of the 3rd–2nd century BC.

[99] Boltric and Fialko 2012.
[100] Koltukhov 2006; 2007.
[101] Skory 1999; Skory and Khokhorovsky 2009.
[102] Romashko and Skory 2009.
[103] Polin and Daragan 2010; 2011.
[104] Mozolevsky and Polin eds 2005.
[105] Bidzilya and Polin 2012.
[106] Skory 1997; 1999; 2005; Skory *et al.* 1999; Kubishev, Bessonova and Kovalev 2009.
[107] Polin 2014.
[108] Kats 1994; 2007; Avram 1996; Conovici 1998; Fedoseyev 1999; Garlan 1999; 2004; 2004/05; Finkielsztejn 2001.
[109] Monakhov 1989; 1999; 2003; 2013; 2014; Monakhov and Kuznetsova 2009; Monakhov and Fedoseyev 2013.
[110] Bidzilya and Polin 2012: 508–84.
[111] Polin 2010; Polin and Daragan 2010; 2011.
[112] Polin 2015.
[113] Rogov and Tunkina 1998.

These data demonstrate the peak of kurgan construction in the steppe Scythia region of the northern Pontus during the first half and third quarter of the 4th century BC, the end of royal kurgan construction in the third quarter of the 4th century BC, followed by a sharp decline and end of construction of any kurgans by the end of the third quarter and last quarter of the 4th century BC. Most likely, the decay of Scythian life in the lower Dnieper region occurred at the same time as the Elizavetovska hillfort was abandoned before the end of the 4th century BC. However, despite this background of desolation of most of steppe and forest-steppe Scythia, there was a large group of Scythian kurgans of the 3rd–2nd century BC in the lower Dniester region which have no parallels outside that territory.[114]

How do these new facts throw light on the question of the Sarmatian conquest of the northern Pontus? The desolation of the entire forest-steppe, as well as most of steppe Scythia, at the end of the 4th century BC, the location of Sarmatian monuments which could be dated to the 3rd or beginning of the 2nd century BC and situated no closer than the Trans-Volga, the appearance of Sarmatians on the lower Don no earlier than the 2nd century BC: these facts are increasingly expanding in time and space the distance between the end of Pontic Scythia in the late 4th century and the emergence of Sarmatians in the northern Pontus in the 2nd–1st centuries BC. When combined, they prove the absence of a causal-temporal link between these events. Sarmatian raids on the Chersonesus chora and European Bosporus, as well as the participation of Sarmatians in the events around Olbia in the 3rd century BC, mentioned in a decree in honour of Protogen, seem fantastic due to the remoteness of the Black Sea theatre of military operations from the localisation of the Sarmatians of the 3rd–2nd century BC not closer than the Trans-Volga.

The Scythian centres in the 3rd century BC were localised in the lower Dniester (Glinoye) and in the Crimea (Ak-Kaya / Vishenoe hillfort), and preceded the late Scythian hillforts of the lower Dnieper and foothill Crimea. The prosperous existence of a large Scythian group west of Olbia in the lower Dniester region during the 3rd–2nd centuries BC (Glinoe) indicates that the threat of invasion of the Sciren and Galatae, mentioned in the decree in honour of Protogen, did not take place, and the movement of these nations bypassed this region.

According to the available data, the eastern advance of the Sarmatians was slow and cautious, and by no means a crushing invasion or rapid conquest. The defensive walls of Tanais were built no earlier than the turn of the 3rd/2nd or even beginning of the 2nd century BC. Appearing in the lower Don Valley during the 2nd century BC, the Sarmatians advanced to the area between the Dnieper and Don during the second half of the 2nd century, or rather 2nd–1st centuries BC, first occupying empty steppe territories and not affecting late Scythian occupation of the lower Dnieper. The fortifications of the earliest lower left-bank Dnieper Znamenka hillfort were built no earlier than the turn of the 2nd/1st centuries BC, possibly even the beginning of the 1st century BC,[115] indicating only then a Sarmatian threat on the lower Dnieper. Only individual Sarmatian burials of the 2nd and 1st centuries BC have been found on the right bank of the Dnieper, as well as somewhat further to the west. Only after the termination of the Scythian group on the lower Dniester and 'Scythia Minor' in Dobrudzha during the late 2nd and beginning of the 1st centuries BC, did Sarmatians arrive in the lower Danube and move further at the turn of the millennium. Appearing in the late 2nd century BC in Crimea, first as allies of the late Scythian king Palak, they retreated after a crushing defeat on the Pontic steppes and only re-appeared to penetrate Crimea during the 1st century BC–1st centuries AD, and later developing a massive presence there in the Crimean foothills during the 1st and 2nd centuries AD.

As for the reasons for the decline of Pontic Scythia and the late appearance of the Sarmatians in this region, I am inclined to see the main reason being unfavourable natural and climatic conditions.[116] Of course, in these terms it is difficult to explain why the most fertile areas of the lower Dnieper and the Don region in the 3rd–early 2nd centuries BC remained empty, and the Scythians at that time preferred the lower Dniester region, which is inferior in natural conditions. Probably climatic factors were not the sole reason and, in addition to climatic conditions, there may have been some other global catastrophic event(s), including some difficult to imagine today, such as pandemics or epizootics which could easily have caused the disappearance of the vast majority of the Scythian population not only in the steppe, but also in the forest-steppe of the northern Pontic region. Such catastrophic changes covered the entire steppe and forest-steppe belt of Eurasia, where in the 3rd century BC in all regions without exception, a breakdown and disappearance of almost

[114] Polin 2014.

[115] Polin 1992: 108.

[116] N.A. Gavrilyuk prefers to see the reason for the decline of Scythia in the deterioration of general pasture (Gavrilyuk 2013: 528). It seems that pasture deterioration as a result of overgrazing could take place only in certain small areas of livestock accumulation, for example near watering sites but this seems unrealistic in the case of the vast pastures of the northern Pontic region where its diversity of terrain made it possible to use different grazing areas in different seasons and not a single nomad cattle-breeder would ever allow over-grazing. From ethnographic analogies it is well-known how pasturage was protected from premature utilisation, especially where future wintering was required, and the reproduction of livestock has never been excessive as it is regulated by epizootics (with 12-year constancy), and by the effects of regular bad winters.

all previous Scythian-like cultures, either followed by new cultures or the transformation of the old into a qualitatively new form. Beyond the northern Pontic region, across the remainder of the Eurasian steppe and forest-steppe belt, this can be traced less clearly as the chronology of material culture becomes vaguer further east. All these processes with very wide and approximate datings appear smooth and gradual, as with normal evolutionary developments, yet the drastic change in the 3rd century BC over such a large territory could only have been caused by global environmental changes.

The royal Scythian Alexandropol kurgan based on new research data of 2004–2009

Sergei Polin,[1] Marina Daragan[2]

Abstract

Following the initial excavation of the Alexandropol kurgan in 1852–1856, many questions remained about its date, the design of the kurgan, the structure within, the possible presence of further tombs, and the existence of funerary feasts. Further excavations were carried out from 2004–2009 and are now fully published.[3] This paper summarises the main findings, and shows that the Alexandropol kurgan can be reconstructed as follows. Judging by the volume of the earlier excavation spoil-heaps, it had a volume of about 130,000 m^3, was most likely 23–24 m high, and its surface originally clad in stone. At the summit once stood a Scythian or Polovets stone statue. Renewed excavation of the central tomb allows us to determine its size and construction details. The absence of lateral underground passages along the long walls of the catacomb of the central tomb has been confirmed and two further niches located within the precincts of chamber, which are additional to one found in 1855. The modest size of the catacomb of the central tomb, and the types of finds made therein, suggest the interment of a man and woman only. The latest anthropological study of human crania found inside indicate them to belong to a woman aged 20–35 years and a man aged over 50. Around the kurgan was a vertical stone revetment wall, standing over 4 m high, with a diameter of about 80 m, and constructed of huge slabs. 11 types of stone were used in its construction, and sourced from different deposits located 40–80 km from the kurgan as the crow flies, or up to 160 km by road. Beyond this lay a ring ditch measuring 110 m in diameter, 4.0–5.7 m across and 2.2–3.3 m deep. To the west, the remains of a funerary feast (*trizna*) was found, covering an area of 120 x 15 m (about 1800 m^2). This contained fragments of 457 ancient Greek amphorae with 52 stamps, representing Heraclea Pontica, Ikos, Chersonesus, Thasos, Chian, Sinope, Mende and seven others, and all dating to 340–330 BC. Moreover, the bones of 99 animals consumed during the funerary feast (bulls, horses, sheep, goats, dogs, pigs, a hare and a deer), fragments of Scythian modelled vessels, arms, a horse bridle and personal ornaments were found, as well as some fragments of human remains which testify to the existence of ritual cannibalism. Among these funerary feast remains were 11 burials of men, a woman and children of different ages, all killed during the event. These remains were sealed by a 0.9–1.1 m high earth bank, which varies in width from 6.5 to 20 m and surrounds the complex. The contemporaneity of all tombs and other objects of Alexandropol kurgan (embankment, the revetment, ditch, near-kurgan funerary feast, passages) was confirmed, and the previously rather mysterious passages indicated to have had a ritual function. The kurgan was finally plundered through a vertical shaft dug from the summit to the central tomb and by means of additional tunnels.

Keywords: Alexandropol kurgan; Scythian royal kurgan; amphorae; amphora stamps; Scythia; northern Black Sea region; funeral feast; labour costs

On the place of the Alexandropol kurgan in the Scythian kurgan system

The Alexandropol kurgan stood to a height of 24 m and was one of the four largest royal Scythian steppe kurgans in the northern Black Sea region, alongside the Solokha, Chertomlyk and Oguz kurgans which measure between 18 and 20 m in height respectively (Figures 1–2). These were explored during the second half of the 19th and beginning of the 20th centuries but the Alexandropol kurgan was the first royal Scythian kurgan to be investigated for purely scientific purposes. It was first excavated between 1852 and 1855 by M. Bukhteyev, a member of the Odessa Society of History and Antiquity, A.V. Tereshchenko and A.E. Lyutsenko, Curator of the Kerch Museum of Antiquities. Previously known as the Lugovaya Mogila ('The Meadow Barrow'), the mound was completely removed during these excavations, and in 1855/56 A.E. Lyutsenko went on to uncover and study the many underlying subterranean structures.[4] The complete excavation of a kurgan such as this was unusual for this period of excavation and, as observed by M.I. Rostovtseff, conducted in an exemplary manner for its time.[5]

Owing to its massive size, multitude and complexity of underground burial structures considered to be looters' tunnels, the opulence of the grave-goods, and its late date, the royal Scythian mound of Alexandropol plays

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[3] Polin and Alekseev 2018.

[4] DGS 1866*a*: 1-25, fig. in p. 1, 24, 23; 1866*b*: table 'A', I-XXI; Lazarevsky 1894.

[5] Rostovtseff 1925: 428–29.

Figure 1. Alexandropol kurgan: view from the northwest
(drawing by I.N. Medvedeva, 1856)

a significant role in Scythology as a monument which illustrates and defines the final stage of steppe Scythia in the northern Black Sea region. The eastern style of some finds, and the physical anthropological similarity between several 'royal' crania from the Alexandropol and the Savromat type from the lower Volga region,[6] has led to some rather radical hypotheses. M.I. Rostovtseff discusses some objects of a new type which led him to conclude that the 'Alexandropol kurgan closes the old Scythian series and opens a new one, marked by an influx of new eastern elements of a kind different to the ones prevailing in southern Russia during the Scythian period'.[7] Based on finds from Scythian kurgans of the northern Black Sea region of supposed eastern type,[8] material from the lower Dnieper settlements which according to his data had been destroyed at the very end of the 5th and beginning of the 6th centuries BC,[9] and the anthropological findings from the Alexandropol kurgan,[10] T. Sulimirsky surmised that there had been a change in the ruling class in Black Sea Scythia at the beginning of the 4th century BC. The 'Royal Scythians' of Herodotus were replaced by the Sarmatians (Savromats), who expanded here from the lower Volga region, subjugated the local Scythian population and then gradually mixed with it.[11] According to A.Yu. Alekseev, a rather distinctive eastern style of some bridle sets from Alexandropol is evidence for a new direction in communication with central Asia which was adopted in the Black Sea region of Scythia at the end of the 4th century BC, and following Alexander's campaigns.[12]

According to the hypothesis raised by M.I. Rostovtseff, the Alexandropol kurgan is the latest belonging to the highest level of Scythian aristocracy in the northern Black Sea region. He originally dated it to the first half of the 3rd century BC, but later revised this to the beginning of the 3rd century BC.[13] Over time, as the chronology of Scythian material culture was refined, the Alexandropol kurgan was also dated more closely. Using amphorae and makers' marks, I.B. Brashinsky dated it to the first quarter of the 3rd century BC.[14] A year later, M.I. Artamonov dated

[6] Firshteyn 1966.
[7] Rostovtseff 1926/93: 40.
[8] However, the definitions made by T. Sulimirsky are incorrect and unacceptable now.
[9] This is completely wrong as at the end of the 5th and beginning of the 4th centuries BC, the lower Dnieper Scythians settlements were only beginning to emerge.
[10] T. Sulimirsky completed the Alexandropol anthropological series with a cranium from Chertomlyk which according to him belonged to the Siberian racial type (Sulimirsky 1970*b*: 100), but this is clearly a misconception. No human remains were found during the Chertomlyk excavations by I.E. Zabelin in 1862/63 (Firshteyn 1966: 70); the same is true for the remainder of the royal Scythian kurgans studied in the 19th and beginning of the 20th centuries, and there are only crania from the Alexandropol kurgan and a lower mandible from Kul-Oba (Kruts 2005: 459).
[11] Sulimirsky 1970*b*: 100–11.
[12] Alekseev 1993.
[13] Rostovtseff 1912: 149; 1925: 432; 1926/93: 40.
[14] Brashinsky 1965: 102.

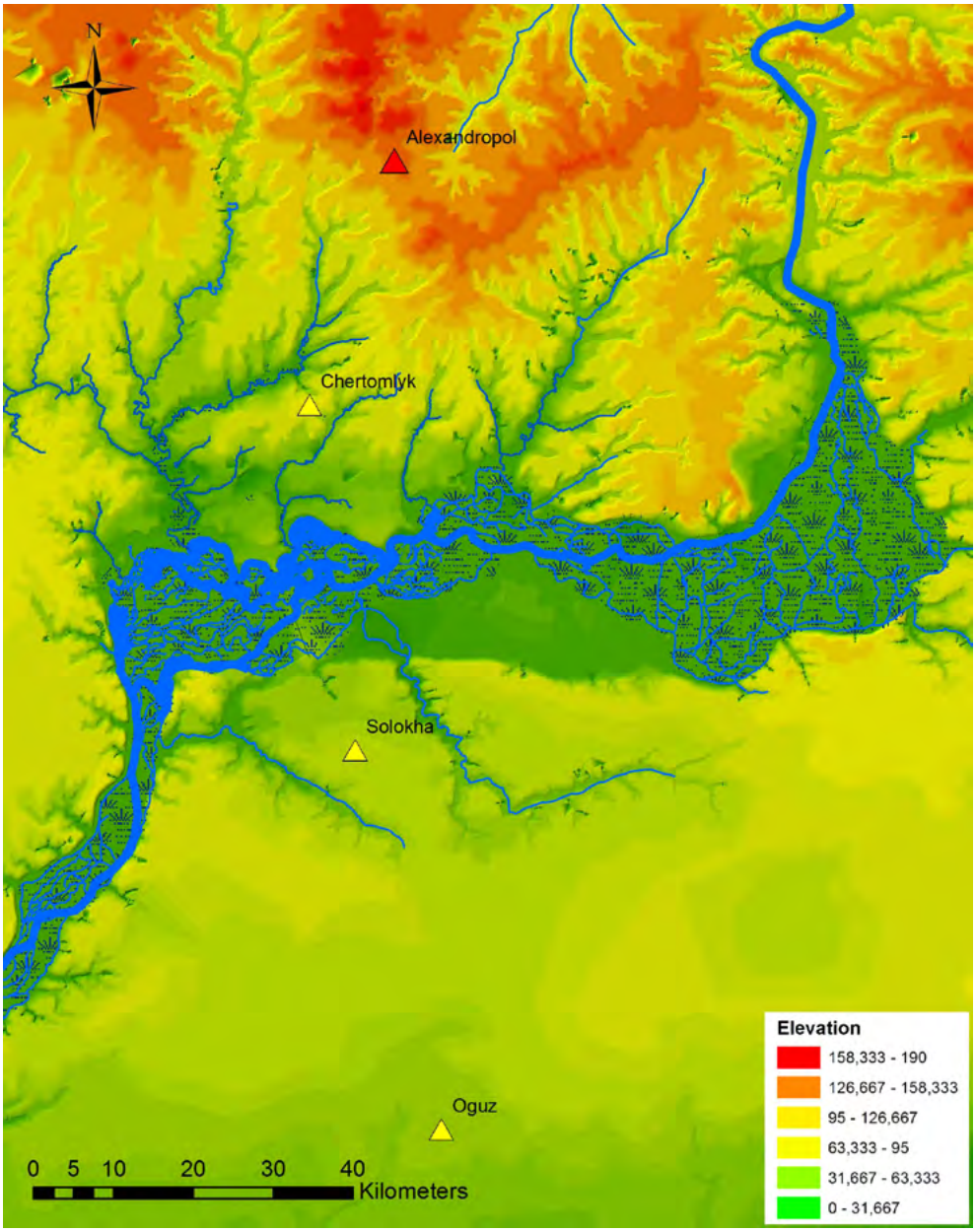


Figure 2. Location of Alexandropol kurgan in the north Pontic region between Scythian royal kurgans of Chertomlyk, Solokha and Oguz

the Alexandropol kurgan to around 300 BC.[15] N.A. Onayko dated the makers' marks on the amphorae to no later than the end of the 4th century BC, the pyxides to the end of the 4th and beginning of the 3rd centuries BC, and the gold plaques and some other objects to some point during the 4th century BC.[16] Based on the dating of similar makers' marks found in the Myrmekion ash pit, V.I. Pruglo placed the Alexandropol kurgan in the third quarter of the 4th century BC, and no later than 320 BC.[17] After considering revisions to the dating of these potters' marks, A.I. Melyukova re-dated the main burial of the Alexandropol kurgan, along with its under-burial through the eastern dromos, to the mid- and second half of the 4th century BC, whereas the subsidiary northeast tomb was compared with the latest royal kurgans in the lower Dnieper and dated to around the end of the 4th and first quarter of the 3rd centuries BC.[18] A.Yu. Alekseev instead dated the kurgan to around the last third, but tended towards the last quarter of the 4th century BC, i.e. around 320 BC, and the northeast tomb to the end of the 4th century BC, *c.* 300 BC.[19] Using as a starting point the chronology of the Myrmekion ash pit, V.I. Pruglo went on to date the Alexandropol makers' marks and, by extension the kurgan itself, to the 330s BC.[20] Later still, using a refined chronology of amphora types and makers' marks identical to those found in the Alexandropol

[15] Artamonov 1966: 58.
[16] Onayko 1970: nos 202, 466, 497.
[17] Pruglo 1972: 17.
[18] Melyukova 1981: 102.
[19] Alekseev 2003*a*: 270.
[20] Monakhov 1993.

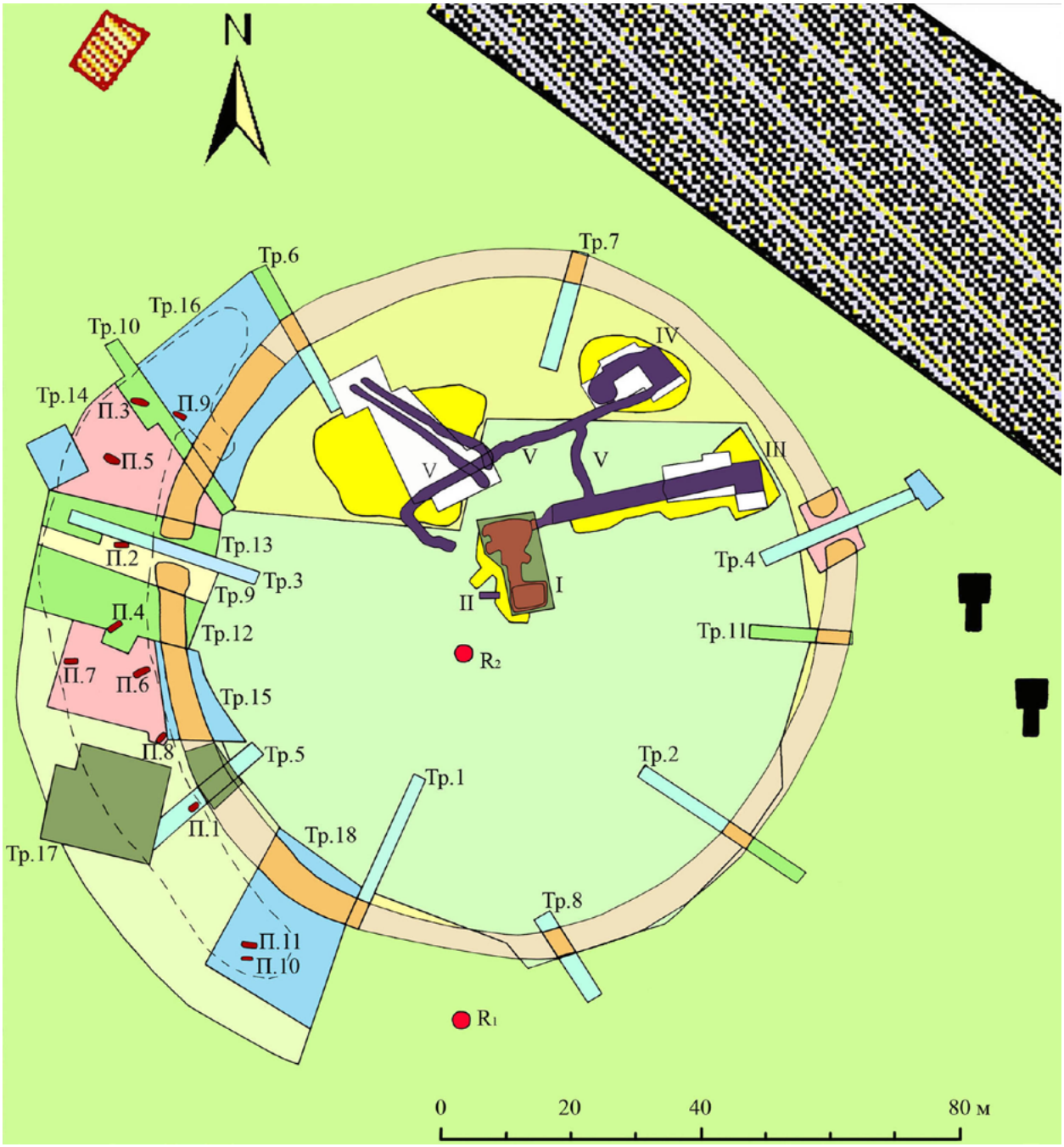


Figure 3. General excavation plan of the Alexandropol kurgan 2004–2009: 1, excavations in 2004; 2, excavations in 2005; 3, excavations in 2006; 4, excavations in 2007; 5, excavations in 2008; 6, excavations in 2009; 7, excavated parts of the ditch; 8, unexcavated parts of the ditch; 9, the area of the near-burial funerary feast; 10, sacrificial burials; 11, the near-burial funerary feast; 12, tombs and underground passages investigated by A.E. Lutsenko in 1855/56 (I, the central tomb; II, burial of a horse; III, eastern dromos; IV, side northeastern tomb; V, underground passages); 12, contours of previous excavations made by A.E. Lutsenko 1855/56; 13, contours of later excavations by A.E. Lutsenko; 14, benchmark; 15, modern constructions (slaughterhouse building, concrete silo trench, water towers)

kurgan, he concluded that they should be dated instead between the second half of the last quarter of the 4th century BC and the beginning of the 3rd century BC.[21] More recently, after re-examining new materials, including new finds from the Alexandropol excavations of 2004–2009, he adopted the original dating of the Alexandropol makers' marks as 340–330.[22] The necessity to ascertain once and for all the exact dating of the Alexandropol kurgan triggered its re-excavation in 2004–2009 (Figure 3).

[21] Monakhov 1999: 434–38; 2002: 172–74; 2003: 137–38.

[22] Monakhov 2016: 312.

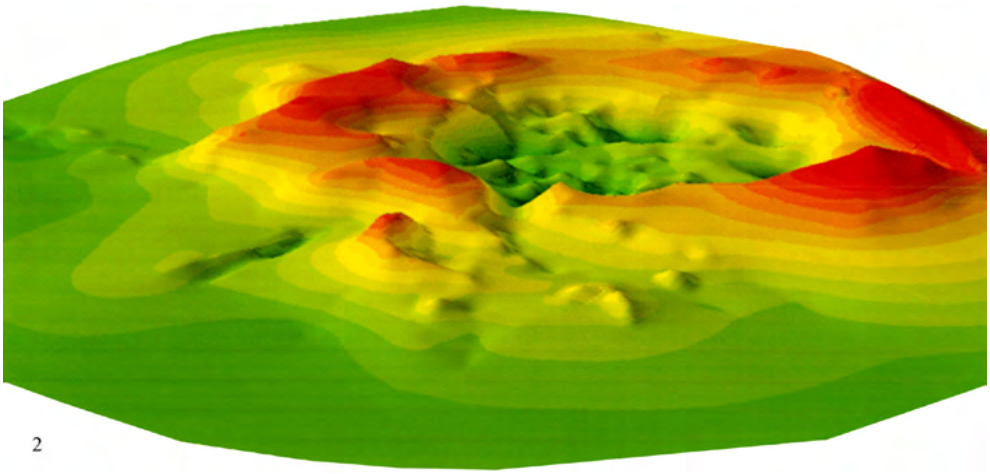


Figure 4. Alexandropol kurgan on the eve of excavation in 2004-2009: tacheometer survey

Research 2004–2009

At the beginning of excavations in 2004, the Alexandropol kurgan resembled a circular platform, 100 m across, and pitted with holes of different sizes. It was surrounded by a ring of spoil heaps left from the 1852–1856 excavations which rose to a height of up to 5 m (Figure 4). The first excavation season was devoted to defining the edges of the kurgan, finding the surrounding ring ditch, and determining its diameter (110 m). This proved to be 4–5.7 m wide at ground level and 1.7–3.2 m deep (Figure 5). On the western and eastern sides, the ditch measured 3.6–4.1 m across (Figures 6–7). Within the ditch itself were a large number of small stones displaced from the inner kurgan wall, as well as some traces of the funerary feast (*trizna*) represented by sherds of amphorae and fragmentary animal bone. In the majority of the Scythian kurgans the remains of this feast are usually discarded in the ditch but the Alexandropol kurgan is exceptional as the ditch contained a negligible number of such remains, which were instead found around the perimeter of the kurgan, specifically on the western side of the ditch.

Figure 5. Ditch of the Alexandropol kurgan

The Alexandropol kurgan funerary feast

Beyond the ditch and spreading over a wide area on the western side of the kurgan, we recovered traces of a near-kurgan funerary feast which had been performed after the burial of the Scythian king and queen inside the kurgan (Figure 3). This was an astounding discovery. Owing to the unique conditions, these feasting remains had been covered by the dump left by the 1852–1856 excavations, thus the large platform where the rites had been performed was preserved in full. In contrast, in the case of Scythian kurgans found in arable fields, such platforms have tended to be destroyed through ploughing. For the first time in the history of Scythian archaeology, there was therefore the opportunity to study the near-kurgan funerary feast ritual of a royal Scythian burial, and each of the six years of excavations from 2004–2009 made this a priority. As a result, the 120 x 15 m (1800 sq m) platform along the western side of the kurgan, beyond the ditch, was studied in its entirety. The numerous finds consisted of Scythian pottery, bronze and iron arrowheads, fragmentary armour plate, horsegear elements, personal jewellery (beads and an earring), iron nails and brackets, tools, and groups of gold clothing appliqués (Figure 8). The latter numbered 267 in all, including 19 fragmented examples (Figure 9), and had been used to decorate female clothing which was probably thrown away and trampled into the dirt during the course of the feasting.

The most important discovery among these numerous objects were 457 ancient Greek amphorae

Figure 6. Ditch of the Alexandropol kurgan near the western bridge

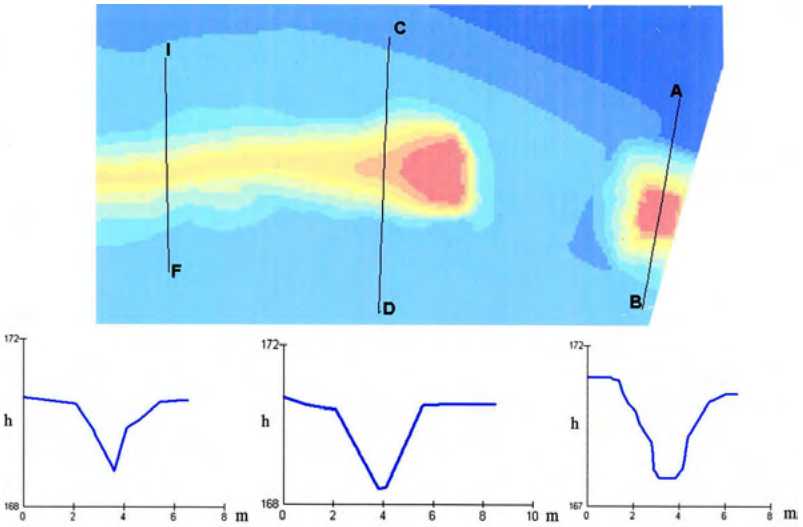


Figure 7. Ditch of the Alexandropol kurgan in the section near western bridge

with 52 makers' marks and made in many centres: Heraclea Pontica (Figure 12, *1-4*), Ikos (Figure 12, *5-6*), Chersonesus Tauri (Figure 12, *7-8*), Thasos (Figure 12, *12-15*), Chian (Figure 10, *9-11*), Mende (Figure 12, *17*), Sinope (Figure 12, *16*), one of the centres of the eastern Black Sea (Figure 13, *2-3*), three other as-yet unidentified Greek locations (Figure 13, *4-10*), Murigiol-type amphorae (Figure 13, *11-12*) and Solokha I (Figure 13.1). The sherds of amphorae formed a thin even layer along the western crossing across the ditch (Figure 3.10-11). Further north and south the type of distribution changes and they only appear in isolated spots.

In addition, there were large quantities of animal bones left from the feast, consisting of 99 specimens of primarily domesticated animals: oxen, horses, sheep, goats, dogs, pigs and a small number of game animals, namely rabbit and deer.

Figure 8. Finds of gold objects in funerary feast of the Alexandropol kurgan

Figure 9. Finds of gold objects in funerary feast of the Alexandropol kurgan

Figure 10. Amphorae from the funerary feast of the Alexandropol kurgan

Figure 11. Amphorae from the funerary feast of the Alexandropol kurgan

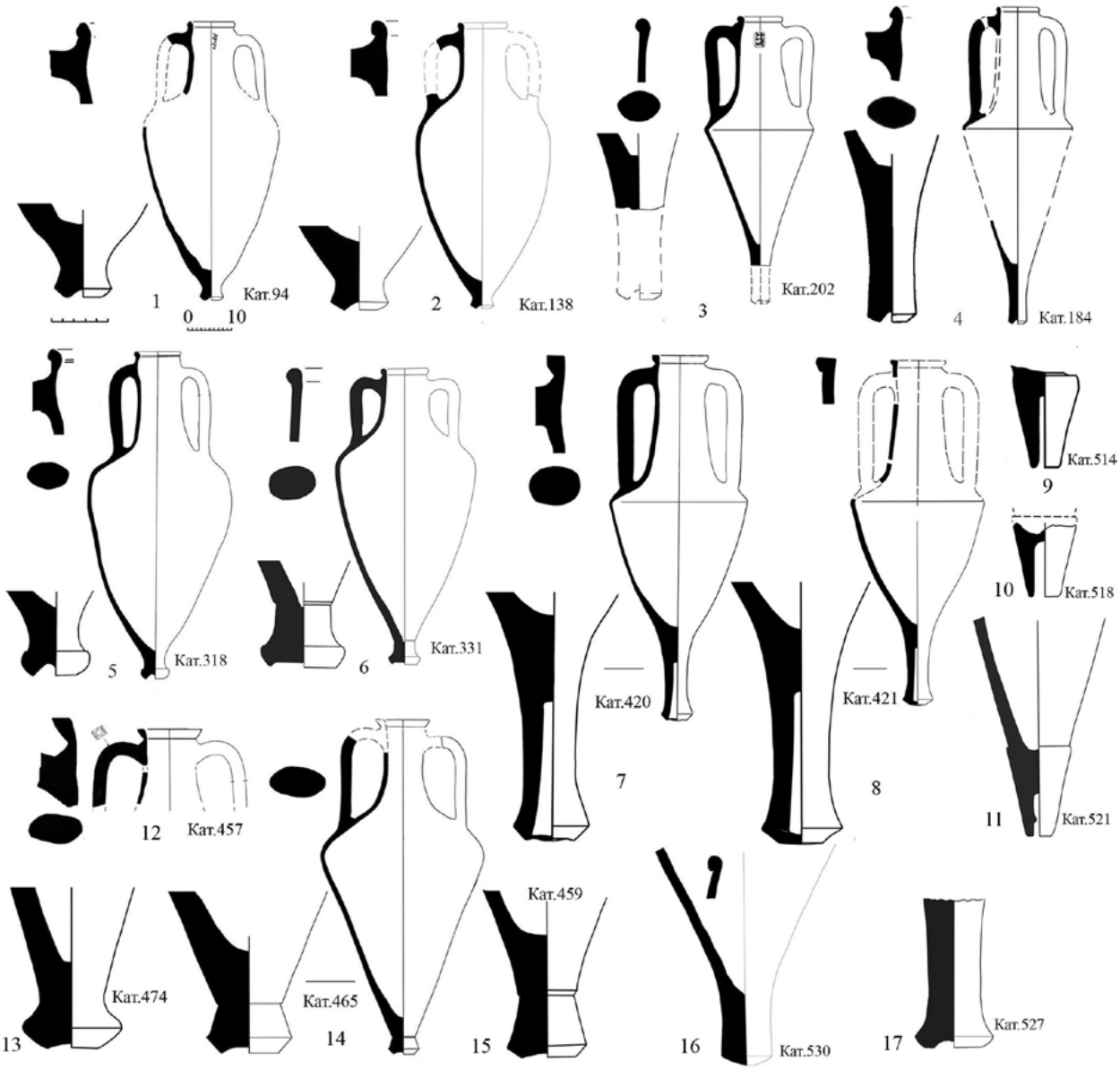


Figure 12. Amphorae from the Alexandropol kurgan: 1–2, Heraclea Philoidnogo type; 3–4, Heraclea conical; 5–6, Ikos 'red clay'; 7–8, Chersonesus Tauri; 9–11, Chian; 12–15, Thasos; 16, Sinope; 17, Mende

Accompanying burials in the Alexandropol kurgan funerary feast

One cannot over-estimate the significance of another incredible discovery. Among the remains of the funerary feast, there were several fragments of human bone which appear to exhibit evidence of cannibalism. Such finds are rather frequent in the tombs of Scythian nobility. However, the most important, as well as the most unexpected, discovery was that of 11 accompanying burials of men, women and children interred in the platform (Table 1; Figures 14–16).

These burials uncover an awful side of the Scythian funerary ritual: all of these people – men and women of different ages, adolescents and children – had been slaughtered during the wake and buried there and then. These burials contained arrowheads stuck in their soft tissue (Figure 17). The result is a horrific picture of the feast where mourners were apparently shot in a cascade of arrows and killed, with some of the crowd potentially trampled and killed in the resulting stampede during this unexpected ambush. This reconstruction of the wake explains the completely random combination of the 11 individuals buried after the feast.

Human remains from the feasting area

Trench 15/2007 on the southern side of the feasting area contained fragmentary human remains belonging to a young female and a child. The Alexandropol kurgan had already yielded such finds before, as a human

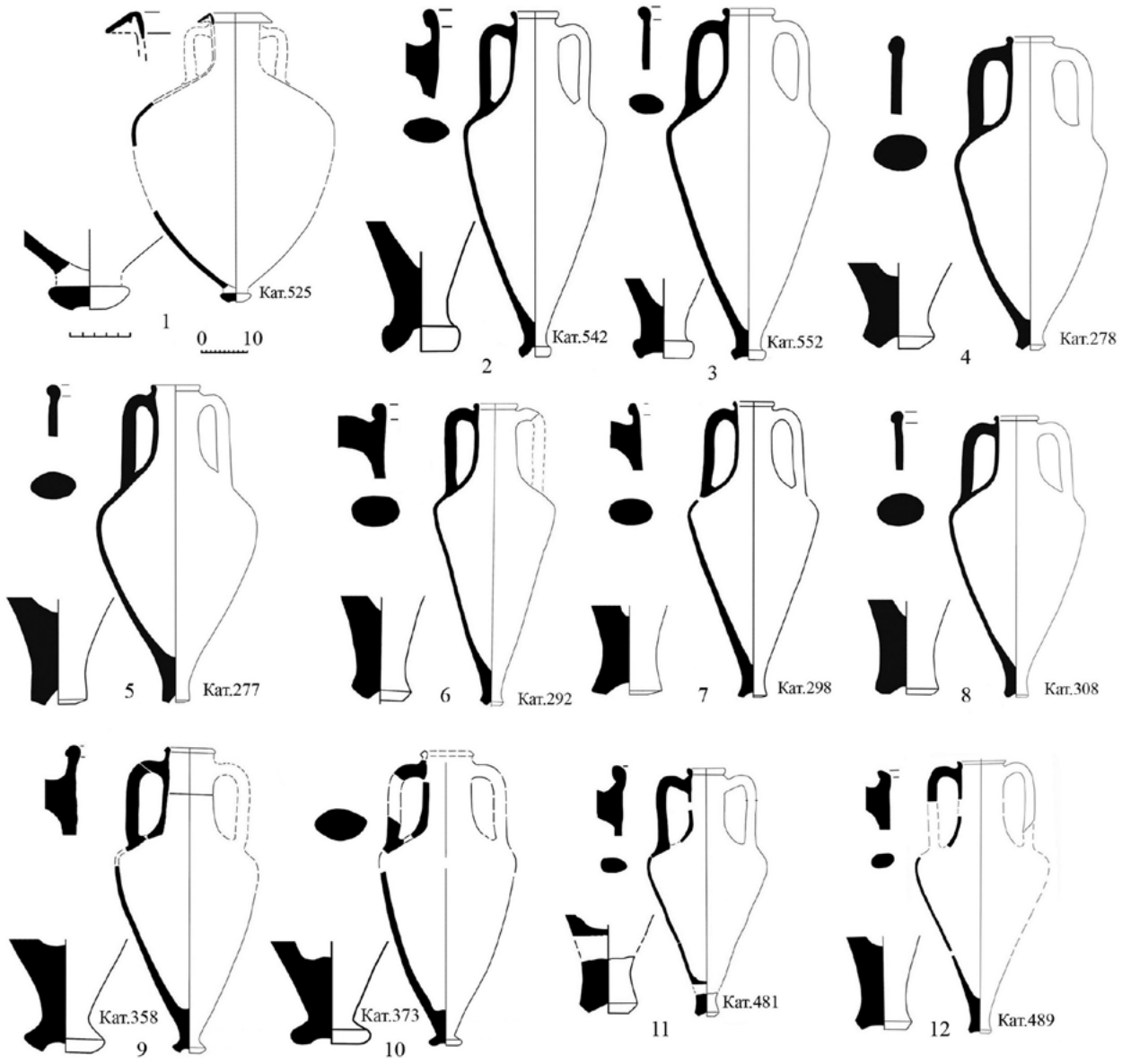


Figure 13. Amphorae from the Alexandropol kurgan: 1, Solokha I; 2–3, eastern Mediterranean, unknown centre; 4–5, Heraclea, 'orange series'; 6–8, Heraclea, 'brown series'; 9–10, Ikos-2 'brown clay'; 11–12, Murigiol type

Individual	Gender	Age at death
1	Male	20–30
2	Male	35–45
3	Male	20–30
4	Male	18–25
5	Male	Young/adult
6	Male	20–25
7	?	10–14
8	Male	45–55
9	Male	30–40
10	?	3–5
11	Female	25–30 (35)

Table 1. Age at death of individuals found buried in the platform[23]

mandible was discovered in 1853 in the eastern part of the mound.[24] Such finds had also been made at other kurgans in the northern Black Sea region. A humerus was discovered in the ditch of Babina Mogila. Grave 2 of the Sobolevsky burial contained, among accompanying offerings, a pile of finely chopped bones, among which was a fragmentary human tibia. The Kamenskaya Bliznitsa kurgan ditch contained a humerus; outside the western passage through the ditch of this kurgan, covering an area of 24 x 6 m, was a collection of objects, including animal bones, fragmentary amphorae and the complete skeleton of a child stretched on its back. Among the stones in the various parts of the grave walls at Chertomlyk, scattered human remains were found, belonging to a mature male aged around 30–59

[23] Kozak 2018.

[24] DGS 1866*a*: 5.

Figure 14. Sacrificial burials in the funerary feast of the Alexandropol kurgan: burial 1

Figure 15. Sacrificial burials in the funerary feast of the Alexandropol kurgan: burial 3

Figure 16. Sacrificial burials in the funerary feast of the Alexandropol kurgan: burial 6

Figure 17. Arrowhead embedded in human bone from burial 6

years, a young male of 20–25 years, a 20–29 year old male, an older male aged 40–59 years, and a woman of indeterminate age. In the ditch of the kurgan there was also a holed cranium, and a human bone was found in the ditch of kurgan 25. The outer ditch of the kurgan near Kamenka-Dneprovskaya, studied by V.V. Otroschenko and Y.Y. Rassamakin in 1986, contained fragments of three crania belonging to two males and a young female. The ditch of the kurgan near the village of Sivashovka contained scattered human remains. Excavations of kurgan 4 near Pervomayevka showed that beneath the retaining wall on the southern side, in a specially excavated hollow covered by limestone slabs, were a shoulder blade, hip bone, pelvis, the cranium of an elderly individual with the lower mandible missing, and a large animal bone. Kurgan 13 near Lvovo under the third wall there were five holes, one of which contained disarticulated human and animal remains, as well as potsherds. The 4th century BC burial complex Mamai-Gora contained human remains deposited in the ditches of Scythian kurgans, as well as burials accompanied by additional fragments of human remains. Such finds have also been recorded in the forest-steppe: the ditch of kurgan 3, near the Ivankovo village in Porosye, contained cranial fragments of a mature male and two women aged about 25–35 and up to 20 years, and the ditch of the Ryzhansky kurgan also contained human remains.[25] The meaning of all these finds is not entirely clear, but their existence in such a scattered state as part of the feasting remains raises the morbid possibility of ritualistic cannibalism.

A renewed study of the central tomb of the Alexandropol kurgan in 2009

There was a plan for a systematic renewed study of all the kurgan tombs and underground passages previously discovered in the 1855/56 excavations. However, having retrieved the archaeological results acquired throughout the second half of the 19th and first half of the 20th centuries, and noting that most of the graves had been used to dump the carcasses of animals which had perished from various deadly diseases, including anthrax, we restricted our goals to sampling the pre-kurgan surface in order to ensure there were no burials other than those discovered before and to renewed study of the central tomb. Owing to these reasons, we had to exclude the study of the other tombs and the numerous underground passages of the Alexandropol kurgan. However, the sampling the pre-kurgan land surface introduced some new stratigraphic data which confirmed the contemporaneity of the construction of the central tomb and the eastern dromos burial.

In 2009, two months of dedicated work allowed us to re-open and clear the entrance pit, the dromos and the catacomb of the central tomb (Figure 18). The finds were not numerous. Through careful use of a metal detector in the central tomb, we found around 60 stamped gold plaques and various beads, including several of an entirely new type, gold and iron armour scales, iron cheek-piece(?) fragments covered in gold leaf, silver horse bits, a silver button, small fragments of silver and bronze vessels, a fragment of the famous black glazed Alexandropol pyxis, a bronze ball-bearing, iron nails, a profusion of the tiniest bronze leaf fragments, fragmentary iron brackets, two fragments of bronze arrowheads, a sherd of Scythian pottery, a louterion(?) fragment (Figures 19–21), and around 60 fragments of seven different types of amphora belonging to the same Heraclean, Ikos, Ikos-2, Murigiol type, Chian, and eastern Black Sea types as in the feasting area nearby.

The renewed study of the central tomb confirmed it was north of the geometric centre of the kurgan. This is uncharacteristic for Scythian kurgans where the original burials tend to be placed right at the centre. The reasons for this are unclear. The new excavations allowed us to ascertain its size and details of its construction (Figure 18). The entrance pit, dromos and the catacombs had somewhat different sizes and configuration. Their primary differences lie in the more elongated shape of the catacomb, the absence of side looters' passages along the long sides of the catacomb, confirming their absence from the 1855 excavations, and the presence of two extra niches in the chamber walls in addition to that discovered in 1855. In addition, sampling of the pre-kurgan surface provides stratigraphic evidence for the contemporaneity of the construction of the central tomb and the eastern dromos burial.

[25] Daragan 2016*b*; Polin and Alekseev 2018: section 2.4.8-12.

Figure 18. Central tomb of the Alexandropol kurgan: 2009 excavations

Figure 19. Central tomb of the Alexandropol kurgan: items found during the pre-investigation of 2009

With its rather modest size and the true shape of the catacomb of the central tomb ascertained, the material assemblage found within allowed the supposition of no more than two people having been buried in the chamber of its central tomb, namely a man and a woman. An old anthropological study exists for a pair of crania found in the catacomb of the central tomb in 1855, and, according to this, they belonged to a 40-year old man and an older man aged about 60–70 years. However, the material content clearly points instead to the burial belonging to a male and female. A more recent anthropological study was made by V.G. Moiseyev and

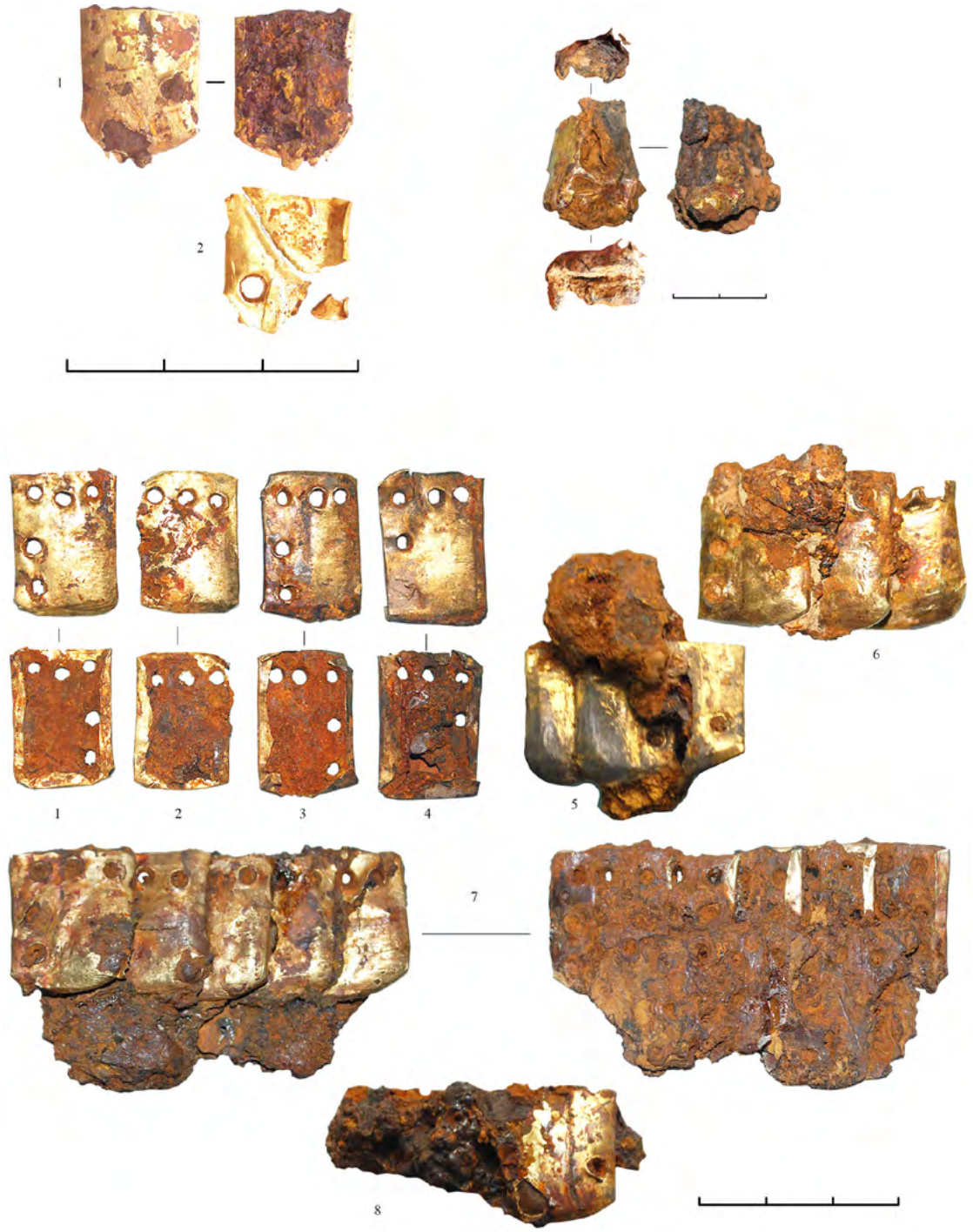


Figure 20. Central tomb of the Alexandropol kurgan:
items found during the pre-investigation of 2009

A.G. Kozintsev, and they indeed concluded that the crania instead belonged to a woman of between 20 and 35 years of age, and a man of over 50. Thus, the composition of the grave goods is entirely consistent with the gender of these individuals interred here (Figure 22). At the same time, recent methods allowed to ascertain the attribution of the cranium from the side (northeast) tomb as that of a man aged about 30.[26]

The accumulated data on the looting of Scythian kurgans in the northern Black Sea region over the past 150 years, as well as the excavations thereof, allow for a re-evaluation of the underground passages discovered in the Alexandropol kurgan. Here it is necessary to exclude the hypothesis that they represented 'looters' bypass mines' along the long sides of the central tomb catacomb walls, as the 2009 excavations proved that these never existed. What was taken to be looters' tunnel entrances proved simply to be animal burrows

[26] The authors are very grateful to V.G. Moiseev and A.G. Kozintsev for their definitions.

Figure 21. Central tomb of the Alexandropol kurgan:
items found during the pre-investigation of 2009

in the chamber walls, which therefore have nothing to do with the tomb or its looting. Other, entirely genuine, passages which had been examined by A.E. Lyutsenko in 1855/56 (passages 7 and 8) were initially thought to have been made by looters, and undoubtedly they could have been used by them at a later stage. However, their creation was instead informed by ritual considerations. This is also true in the case of the mysterious underground passages 14 and 15, which have no connection to the looters, and are of an exclusively ritual nature.

The existing data point to two episodes of penetration of the Alexandropol kurgan during its long history. The first occurred shortly after the end of the kurgan's construction, and was executed using an underground tunnel dug from the entrance pit of the side (northeast) tomb. At the same time a tunnel was dug into the

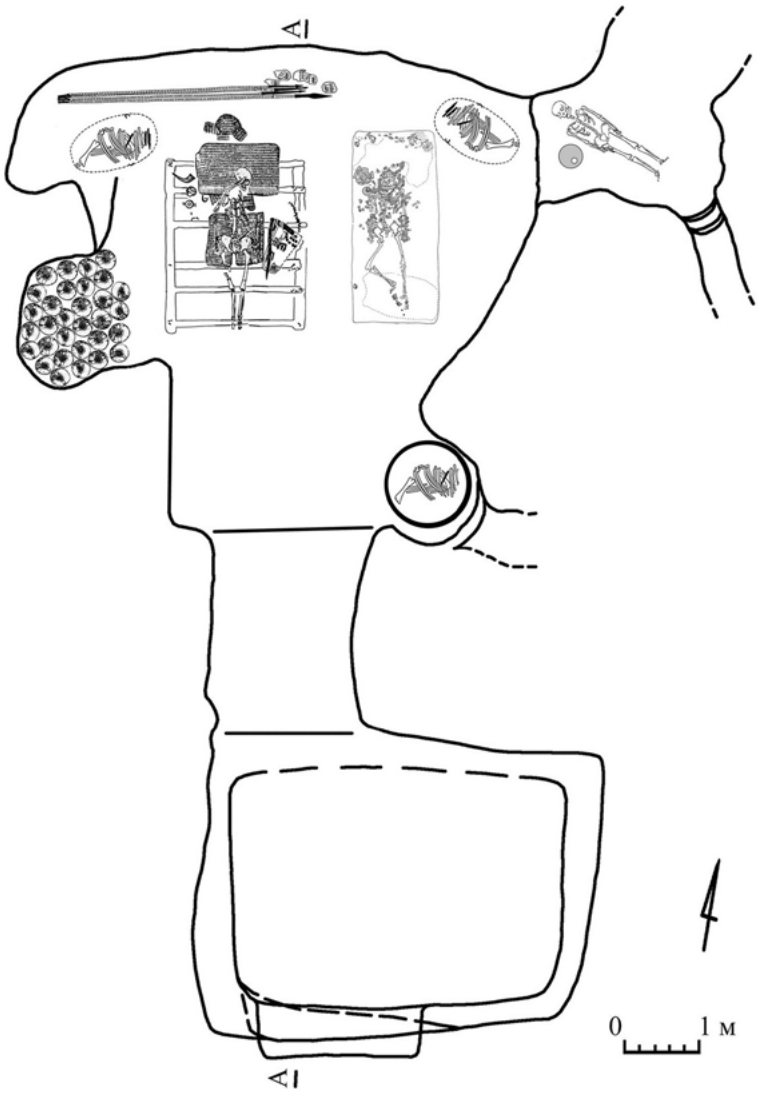


Figure 22. Central tomb of the Alexandropol kurgan: reconstruction of the burial

chamber of the northeast tomb which was later carefully blocked with clay. The decidedly modest set of grave-goods surviving in this tomb suggests that this primary looting saw the careful removal of the largest and most valuable goods, but without disturbing the skeleton within. At the same time the catacomb of the central tomb was also penetrated. However, there is little which can be said about this as a second looting event destroyed any remaining goods. This secondary looting was carried out by a different route as it was by means of a vertical shaft dug from the summit of the mound via the entrance pit of the central tomb. This type of looting is typical of the 19th–20th centuries, but is also occasionally known from antiquity. It probably post-dated the Scythian period but was in or before the medieval period as the top of the robbers' shaft was overlain by an anthropomorphic statue dating to the medieval period. By this time the chamber of the central tomb had long since collapsed and the looters had to excavate massive layers of clay fill. It appears that they succeeded in extracting the largest items, but left thousands of minor objects in the soil. Later looters were also able to enter the eastern dromos and take half of the horse burial goods from the area adjacent to the chamber of the central tomb. The second half of the eastern dromos was left undisturbed, as by that time the ceiling had collapsed and this part of the dromos was inaccessible. Later looters were able to access the underground passages 12 and 13, which is evident by the soil brought here along with the smaller finds. The side northeast tomb remained undiscovered.

The dating of the Alexandropol kurgan according to the results of the 1855/56 and 2004–2009 excavations

The relative chronology of the structures of the Alexandropol kurgan

A.E. Lyutsenko viewed all the tombs of the Alexandropol kurgan as parts of a single complex: a grandiose funeral of a celebrated Scythian leader, and all were considered to be contemporary, but he failed to offer any arguments in support. A.E. Lyutsenko studied the soil deposit layers of the tomb, their position and correlation, and the level of the pre-kurgan surface, and these factors may have influenced his decision. However, M.I. Rostovtseff was the first of many who questioned these conclusions, and the tombs of the Alexandropol kurgan began to be seen as consecutive events completed at intervals and relating to burials of different dates. In 1997 the early idea of a simultaneous construction of the different tombs was revived.[27] This is the only example in the entire Black Sea Scythia region where the central burial structure and the dromos of a side burial are contemporary.

As a result of our re-examination of this kurgan in 2004–2009, a whole range of new data were discovered. The contemporaneity of the central tomb and the eastern dromos was confirmed, primarily stratigraphically, by the discarded soil from the eastern dromos excavated in 2008. This deposit was situated between the entry cavities of the central tomb and the eastern dromos on the level of the ancient pre-kurgan surface, just like the

[27] Boltric 1997: 29–30.

discarded deposit from the central tomb, and proves that both structures were built at the same time.[28]

There is another fact from the old excavations which had never been adequately explained before when establishing the internal chronology of the Alexandropol kurgan. This find was made as early as 1856: a Heraclean amphora stamp 'ΑΨΟΓ[Ο]' was found on the northwest side of the kurgan, perhaps from the tomb retaining wall or feast, and is analogous to another found in 1855 in the central tomb of the kurgan. These finds contradict each other if the side tomb was indeed later than the central one. The discovery of 27 similar stamps in the near-kurgan funerary feast in 2004[29] redresses the situation and confirms the contemporaneity of the structures and tombs throughout the kurgan mound and the feast remains beyond. The contemporaneity of the central tomb and the near-kurgan feasting is also confirmed by the identical sets of amphorae found in both. The contemporaneity of the side northeast tomb and the near-kurgan feast is ascertained by the finding of the same style of Heraclean conical amphorae with identical maker's marks ΕΤΥ|ΜΟΥ. The near-kurgan feast contained three such marks, including one on a complete amphora, which are identical to that found in the northeastern tomb.[30]

The contemporaneity of the kurgan and feast was demonstrated by the general conditions of the area and deposits on the level of the ancient near-kurgan surface, the similarity of amphora types and makers' marks found throughout the entire area, on the feasting platform and within the ditch. These amphorae are represented by a large series from a wide range of production centres, as well as makers' marks. Numerous cases were found where fragments of a single amphora were found in several spots, sometimes tens of metres apart. Particularly notable was the discovery of fragments belonging to one handle of a Chersonesus amphora in the ditch on opposite sides of the kurgan, thus some 80 m apart.

The absolute chronology of the structures of the Alexandropol kurgan

After it was completed, the near-kurgan feast was covered with a ring mound, about a metre high, sealing the deposit completely. Amphorae from the central and side (northeast) tombs of the kurgan are identical in types and stamps to those from the feast. The definitive dating of the set of amphorae from both sets of contexts is determined by the contemporaneity of the amphorae of 14 types, produced in 13 different Greek centres, and the makers' marks on some which were found in both the near-kurgan feast and inside the tombs. Through the work particularly of S.Y. Monakhov,[31] the typology and chronology of the Greek amphorae allows a conclusive dating of these different amphora types made in different Greek centres throughout the 5th–2nd centuries BC. When combined with the advances made by I. Garlam, M. Debidur, V.I. Katz, N.F. Fedoseyev and J. Finkielsztejn on the chronology of the maker's marks, they allow us to conclusively determine the dating of the amphorae and makers' marks from the Alexandropol kurgan, and therefore the kurgan itself.

The amphorae play a critical role in establishing the chronology of the Alexandropol kurgan as these particular types do not date later than the third quarter of the 4th century BC. These amphorae are of the Muriogol, Ikos ('red clay'), Mende Melitopol type, Chian with a cnical toe, Solokha I type. It is the presence of these amphorae in the Alexandropol complex allows to unpick the controversial issues on the dating of the Heraclean maker's marks from Apsog, Etymos, Felix, Herodor and the magistrate The(o)dor, Thasos marks of the later magistrate Navson, Chersonesus stamps on the whole and the stamps of the Chersonesus magistrates Agasykl, Heroxen and Afanodor Nikeyev in particular.

The discovery in the central tomb of the Alexandropol kurgan of a large series of 37 Murigiol type amphorae (7.7% of the total)[32] was a complete surprise. This was the first discovery of this type of amphora in any Scythian kurgans in the lower Dnieper region. S.Y. Monakhov considers them to originate in the Thasos area, and notes the morphological similarity between Heraclean and Thasos wares. According to his data, in the north Dnieper region such amphorae were found in complexes dating to the first half of the 4th century BC.[33] Evidently, the Murigiol type amphorae found left over from the feast of the Alexandropol kurgan represent the latest in the northern Black Sea and demonstrate their survival into the third quarter of the 4th century BC. Our amphorae differ from those described by S.Y. Monakhov from the first half of the 4th century BC, being somewhat squatter, with a shorter neck and handles, and smaller body diameter, and the shoulder is only present on one example. These features characterise Murigiol type amphorae of the middle and third quarter of the 4th century BC. It is probably unreasonable to date them far from the main body of the Murigiol type amphorae which belong to the first half of the 4th century BC, or to date them later than the beginning of the third quarter of the 4th century BC, i.e. 340–330 BC.

The 'red clay' Ikos amphorae from the Alexandropol feast consist of a series of 46 vessels (9.6%). The process

[28] Polin and Alekseev 2018: 222.
[29] Polin and Alekseev 2018: coloured insert, fig. 265.
[30] Polin and Alekseev 2018: coloured insert, fig. 266.7–10, cats 179, 202, 215, 221.
[31] Monakhov 1989.
[32] Polin and Alekseev 2018: fig. 253, cats 477, 513; section 2.6.10.
[33] Monakhov 2003: 79–80, table 55.4–8.

of localisation of these amphorae has been a long and controversial one but finally, thanks to research done on the amphorae workshops of the Greek island of Ikos,[34] it is possible to conclusively relate these vessels with that production line.[35] Thanks to numerous finds, combined with stamped amphorae of known Thasos, Heraclean and Mende types in graves in the Kuban region, the Ikos amphorae have been closely dated to within the middle of the first to third quarter of the 4th century BC.[36] According to research by S.Yu. Monakhov and E.V. Kuznetsova, the dating of this 'red clay' series from the Alexandropol kurgan is limited to the third quarter of the 4th century BC, while the presence of such waisted amphorae support this.

The Alexandropol feast also contained fragments of 11 Chian amphorae with a conical toe (2.3%).[37] All of our vessels belong to the type 5-B Chian amphorae with a conical body and toe which, according to S.Yu. Monakhov, date from the cusp of the 5th/4th and third quarter of the 4th centuries BC.[38]

It is rather odd that the feast of the Alexandropol kurgan contains two fragments of Mende amphorae (0.4%).[39] These amphorae occupy the most significant place among finds from Scythian tombs of the second and third quarters of the 4th century BC in the lower Dnieper region.[40] Our fragments belong to the Melitopol type 2-C which, according to S.Yu. Monakhov, date to the second and third quarters of the 4th century BC.[41] The fabric of amphora cat. 528 is brownish red, which is rare for the Mende type. Such Mende amphorae of Melitopol type with 'red clay' bodies have been discovered in the Chertomlyk feast, which dates to 350–340 BC.[42] Perhaps the small number of Mende amphorae in the Alexandropol feast represents a characteristic in itself, dates the end of their production and, therefore, the final years of the import of Melitopol type Mende amphorae in the Black Sea region sometime in the middle of the third quarter of the 4th century BC.

The Solokha I type amphorae with massive well-developed mushroom ends are represented here by only two amphorae (0.4%). It is thought that amphorae of this shape were produced in numerous Mediterranean centres but it is not clear exactly where ours are from. Nevertheless, the main period of such amphorae is limited to the second and third quarters of the 4th century BC.[43]

The commonest amphorae are the pithoid series of Heraclea Pontica, totalling as many as 90 vessels (18.8%). They are related to the 34 engliphic marks.[44] According to S.Yu. Monakhov, these amphorae are morphologically speaking close to types I-3, I-4 and I-A-3 of Heraclean pithoid amphorae which were produced from the end of the 5th century to the 330s BC,[45] so no later than the middle of the third quarter of the 4th century BC. Of the 34 marks on the Heraclean pithoid amphorae, 29 are represented by the single stamp of ΑΨΟΓΟ. All of these amphorae belong to the same batch, were made in the same workshop, and are contemporaneous. Such pithoid amphorae are also associated with three marks: ΕΠΙ ΘΕΔΩΡΟ|ΦΙΛΙΣΚΟΣ[46] and one – ΦΙΛΙΣ|ΚΟΥ.[47]

Scholars have accepted the later dating of the makers' marks of Apsog and Felix, as well as the magistrate Theodor. According to N.F. Fedoseyev, the Apsog marks date to the last decade of the 4th century BC.[48] V.I. Katz opines that The(o)dor belongs to the magistrate of the fifth group, 330–300 BC, while makers Apsog and Felix belong to the later group of the end of the 4th and beginning of the 3rd centuries BC.[49] However, the marks of the makers from the fifth Heraclean mark group have not been discovered in any well-dated complexes, and their dating is only circumstantial. The same can be said about the dating of the marks from the 'later makers marks' group (LMM), the substantiation of which also includes combined finds of makers' marks of Apsog and Etymos with Chersonesus marks of the first group, following V.I. Katz. We have mentioned before the unsupported late dating for the emergence of the Chersonesus marks which, according to an entire series of archaeological finds, would have appeared at the beginning of the third quarter of the 4th century BC, i.e. around the middle of that century.[50] New discoveries of the Chersonesus marks in the Alexandropol feast confirm this. The discovery of marks of Apsog, Felix and the magistrate Theodor on the Heraclean pithoid amphorae mean that they cannot be dated later than the 330s BC, as that marks the end of production of Heraclean pithoid amphorae.

About half as many vessels in the Alexandropol kurgan were made up of Heraclean biconical amphorae, totalling 46 examples (9.6% of the total), 10 with engliphic marks.[51] These amphorae, or their fragments, were found in the central and northeastern tombs of the kurgan, but mainly in the near-kurgan feast. All of

[34] Doulgeri-Intzessiloglou and Garlan 1990: 375–76.
[35] Monakhov and Fedoseyev 2013.
[36] Monakhov and Kuznetsova 2009: 148–61; Monakhov and Fedoseyev 2013: 259–60.
[37] Polin and Alekseev 2018: fig. 254, cats 514–24, section 2.6.11.
[38] Monakhov 1999: 394; 2003: 21–22, tables 11.6, 12.1-6.
[39] Polin and Alekseev 2018: fig. 255.4, cats 527–28, section 2.6.13.
[40] Polin 2014: 272–601.
[41] Monakhov 2003: 92–94.
[42] Polin 1991: 368; 2014: 449.
[43] Monakhov 2003: 28–29, 102–104; 2014: 202–204; Mozolevsky and Polin eds 2005: 324–27.
[44] Polin and Alekseev 2018: figs 245, 265–66, cats 87–176; section 2.6.1.
[45] Monakhov 2003: 142, tables 87.2–3,8, 88.5,8, 89.4, 92.5.
[46] Polin and Alekseev 2018: figs 245.3, 266.1–3, cats 112, 136, 167.
[47] Polin and Alekseev 2018: figs 245.2, 266.4, cat. 164.
[48] Fedoseyev 2014: 414.
[49] Kats 2007: 430.
[50] Mozolevsky and Polin eds 2005: 379–92.
[51] Polin and Alekseev 2018: 347–59, figs 246, 266.5–14.

the Heraclean conical amphorae from the Alexandropol kurgan belong to types II-A-2, or III-2 и III-3 of Heraclean ware, according to S.Yu. Monakhov, and date from the 380s to the end of the 4th century BC.[52] Recently S.Yu. Monakhov concluded that the Heraclean biconical amphorae (types III-2, III-3) with marks of the magistrates Chromnius, Alket, Silen (Silan), Archipp. Pysistrat, Phemistcleus, Chronius and makers Etymos and Apsog, imitated Thasos biconical vessels produced in the period of 380–330,[53] at the same time as the Thasos biconical vessels ceased being produced in the 330s BC.[54]

Among the 10 marks on the conical amphorae from the Alexandropol kurgan, four are stamped ETY|MOY and come from the near-kurgan feast, and one of the two amphorae from the side (northwest) tomb excavated in 1856,[55] a monogram mark MH on the second amphorae from the other side (northeast) tomb, two fragments marked ΕΠΙ ΘΕΔΩΡΟ|ΦΙΛΙΣΚΟΣ of the mark other than that found on our pithoid amphorae,[56] the stamp [ΗΡΟΔ|Ω]ΡΟΣ,[57] the fragment of the mark with the final letter Λ or Δ,[58] inconsistent with the marks in our collection and irreparably damaged, as well as an anepigraphic mark.[59] The last five marks are from the feast.

Until recently, the makers' marks ETY|MOY were considered to be late and were attributed to the end of the 4th and beginning of the 3rd centuries BC, on the grounds that they had been found alongside Chersonesus marks of the first group (according to V.I. Katz).[60] However, as noted earlier, there is good reason to date the beginning of the Chersonesus marks to the mid-4th century BC and no later than the third quarter of that century.[61] At the same time, kurgan 4 (1909) of the Elizavetovskaya mound contained an amphora with the mark ETY|MOY, which was accompanied by a large amount of black figure pottery, dated at one time by I.B. Brashinsky to the cusp of the 4th and 3rd centuries BC but now dated no later than the mid- or third quarter of the 4th century BC.[62] There have also emerged new data which allow the second variety of the ETY|MOC marks to be placed in the third quarter of the 4th century BC. This is based on a find from pit 105 at the Belozersky hillfort.[63] Also no later than the third quarter of the 4th century are an amphora set from burial 1 of kurgan 9 near the village of Peski, which was composed of two Heraclean amphorae, one with a mark with ETY|MOC, and the Ikos amphorae.[64] Ikos amphorae were manufactured over a span of the first three-quarters of the 4th century BC, and no later.[65] Just recently, the above data with the findings of the Alexandropol kurgan, as well as those from a wide variety of other kurgan and settlement complexes, allowed S.Yu. Monakhov to conclude that marks by the Heraclean maker Etymos, both in the ETY|MOY and ETY|MOC versions, should be dated to 340–330 BC. He too stopped at dating the lunar sigma in the Greek epigraphy and demonstrated with multiple examples its emergence on the cusp of the 6th and 5th centuries BC, and its continuous existence throughout the 5th–4th centuries BC,[66] despite the prevalent idea of the birth of the lunar sigma in the 3rd century BC on the Thasos marks,[67] or at the end of the 4th century BC on the basis of those from Sinope.[68] Thus, dating of the ETY|MOY and ETY|MOC marks to the 340–330 BC, has been based on a large number of complexes, and is therefore well founded.

The monogram mark MH from the Alexandropol kurgan remained unique for a long time and it was not until 2001 that another was found, namely in kurgan 2 near Leninskoe village in the Dnieper region.[69] This feast contained at least eight Heraclean amphorae with this mark, and on one there was also a stamp indicating manufacture at Ikos.[70] As the Ikos amphorae date to the first to third quarters of the 4th century BC,[71] the MH mark can be no later than the third quarter of the 4th century BC.[72]

The clay determined the Heraclean origins of another 43 unstamped amphorae from the feast (9%). These amphorae could be either pithoid or conical. Evidently, their numbers are divided between the pithoid and conical shape similarly to the established ware, namely 2:1, and must date to the same period. In general, the Heraclea Pontus amphorae predominate at the Alexandropol kurgan, where they number 179 (37.4%) of the total of 479.

The Alexandropol feast also contains two previously undescribed series of amphorae from the Heraclean area, morphologically similar to Heraclean amphorae but possessing a very different colour of the outer and inner surfaces, as well as a different clay composition,

[52] Monakhov 2003: 136–38, 141–42, tables 96.5–7, 98.5–7, 99.
[53] Monakhov 2016.
[54] Monakhov 2003: 70.
[55] Polin and Alekseev 2018: figs 246.1, 6–8, 266.7–10, cats 179, 202, 215, 221.
[56] Polin and Alekseev 2018: figs 246.3, 266.5–6, cats 199, 212.
[57] Polin and Alekseev 2018: figs 246.5, 266.13, cat. 214.
[58] Polin and Alekseev 2018: fig. 266.12, cat. 213.
[59] Polin and Alekseev 2018: figs 246.2, 266.11, cat. 196.
[60] Monakhov 2002: 172–74; 2003: 137–38; 2006: 92; Kats 2007: 430; Fedoseyev 2014: 414.
[61] Mozolevsky and Polin eds 2005: 379–92.
[62] Polin 1992: 33; 2014: 524; Monakhov 1999: 436.
[63] Bylkova 2005: 264–66; Polin 2014: 518–20.
[64] Polin 2014: 482–83.
[65] Monakhov and Kuznetsova 2009: 160; Monakhov and Fedoseyev 2013: 259–60.
[66] Monakhov 2016.
[67] Kats 2016: 247.
[68] Fedoseyev 2014: 414.
[69] Monakhov 1999: 432.
[70] Pioro and Samoylenko 2001: 28–29, fig. 6.1–12.
[71] Monakhov and Kuznetsova 2009; Monakhov and Fedoseyev 2013.
[72] Polin 2014: 518, fig. 443.

and a complete absence of characteristic makers' marks. The 'orange series' of amphorae from the Heraclean area in the Alexandropol feast is made up of 24 vessels (5%).[73] They mimic the shape of various types of Heraclean pithoid amphorae of type-I, which existed around the end of the 5th to first half of the 4th centuries BC, and no later than the 330s BC.[74] The 'brown series' of amphorae from the Heraclean circle in the Alexandropol feast consists of 22 vessels (4.6%).[75] Their shape is consistent with the Heraclean amphorae type II-1 (per S.Yu. Monakhov), dating to within 360–340 BC.[76]

The Chersonesus Taurus amphorae from the Alexandropol feast comprise a separate representative group of 47 vessels (9.8% of the total), which are associated with five relief marks on the handles. They belong to type III of the Chersonesus amphorae (following S.Yu. Monakhov). As a result of the emergence of new materials – Zaporozhye amphorae and our series of Alexandropol feast amphorae – it has been possible to re-define the type III Chersonesus amphorae, represented in the selection of S.Yu. Monakhov by the incomplete examples with missing feet and necks. It therefore became clear that the Chersonesus type III amphorae imitated the Melitopol type II Mende amphorae (S.Yu. Monakhov), which circulated throughout the second and third quarters of the 4th century BC.[77] Consequently, this imitation must be no later than the end of the third quarter of the 4th century BC, when the manufacture of the Melitopol type Mende amphorae ceased.

The hollow feet which are so characteristic of all Chersonesus amphorae from the Alexandropol feast, imitate a feature of Mende amphorae, and represent a rare trait for the Mende wares. Such a feature, although of a somewhat different nature, appears on only a few of the amphorae from the Chertomlyk kurgan, the Melitopol kurgan and the Zheltokamenskaya Tolstaya Mogila, and confidently dated to the mid- and third quarter of the 4th century BC.[78]

The Chersonesus marks from the Alexandropol feast belong to Herokhen, Agasiclus and Aphanodor Nikeyev, according to the chronology of V.I. Katz, therefore belong to Group 1-B (306–297 BC), Group 1-Γ (296–287 BC) and Group 2-A (286–273 BC).[79] However, the characteristics of the Alexandropol feast is that they were all used in one episode and therefore must be contemporary, thus we can confidently say that the typological schematics do not represent a chronological factor for the Chersonesus marks.

The chronological context of the Alexandropol feast, the presence there of amphorae groups such as the Murigiol type, 'red clay' amphorae from Ikos, Chian conical toe ones, Mende and Solokha I amphorae, the dating of which does extend beyond the third quarter of the 4th century BC, also limits to the same period the Chersonesus amphorae and associated makers' marks from the feast. This is confirmed by the types of Chersonesus amphorae found in the feast, as these mimic the Melitopol type Mende amphorae of the second and third quarters of the 4th century BC. This confirms their dating to the third quarter of the 4th century BC, and there is no reason to suspect continuing production of Chersonesus copies after the prototype had faded away.

The Thasos amphorae in the Alexandropol feast are represented by 20 vessels (4.2%). They have six associated makers' marks on the amphora handles.[80] Represented by a foot of a Topraisar type amphora, the remainder belong to the early variety of later conical amphorae of type II-C-3 (following S.Yu. Monakhov), the emergence of which, according to the general chronological context of the Alexandropol feast, would be reasonable to place deep in the third quarter of the 4th century (around 340–330 BC). The set of Thasos amphora types from the Alexandropol feast reflects a period of co-existence of Topraisar type amphorae, survived until the third quarter of the 4th century BC, and the later conical amphorae which were just appearing at that time. The latter are associated with four identical marks: ΘΑΣΙΩΝ – shield – ΝΑΥΣΩΝ and two illegible marks. These marks have, over the past few decades, been ascribed dates between 330 and 310 BC. However, the overall chronological context of the Alexandropol feast gives credence to the previous dating of M. Debidur to 335–325 BC.[81]

The Sinope amphorae are represented by nine vessels (1.9%) at the feast. They are associated with one mark on the handle.[82] A limited number of marked parts could equally belong to the Sinope pithoid types II-B of the second half of the 4th–3rd centuries BC (per S.Yu. Monakhov).[83] The dating of the Sinope amphorae from our feast in particular, and the Alexandropol feast and kurgan on the whole, confirms the presence of the only Sinope maker's mark, recently conserved by N.F. Fedoseyev, owing to the discovery of a new complete example of such stamp in Horhippia.[84] This

[73] Polin and Alekseev 2018: 367–73, fig. 247.
[74] Monakhov 2003: 127–32, tables 86–91.
[75] Polin and Alekseev 2018: 374–80, fig. 248.
[76] Monakhov 2003: 134–35, tables 93,1-4.
[77] Monakhov 2003: 92–94.
[78] Polin 2014: 449, 454, 475, figs 385.3,44, 385.4,7, 385.9,5–7, 392.7, 404.1, 6, 11–12.
[79] Kats 2007: 442.
[80] Polin and Alekseev 2018: figs 252, 267.6–11, cats 457–76.
[81] Polin and Alekseev 2018: 420–27.
[82] Polin and Alekseev 2018: figs 255.1–3, 267.12, cats 529–37.
[83] Monakhov 2003: 149–50, table 102.1–4.
[84] Kats 2015: no. 1300.

mark, ΜΝΗΣΙΟΣ | ΑΣΤΥΝΟΜΟ | ΔΕΛΦΙΝΙ[Ο] with an unknown logotype, belongs to the magistrate Mnesy from the beginning of the second magistrate group and, according to V.I. Katz, is the very beginning of the second group of the Sinope magistrate marks, dating to around 340 BC.[85]

The amphorae from an unknown centre in the northern Mediterranean are represented in the Alexandropol feast by 25 vessels (5.2%).[86] Judging by the context, they must date to the third quarter of the 4th century BC.[87]

The 'brown clay' amphorae of the Ikos-2 type are represented in the Alexandropol feast by 52 vessels (10.9%). There is yet no literature about this type. A certain similarity between the separate elements of the series gave it its name, the 'brown clay' series Ikos-2 type, although no relation to that island has been confirmed and no such wares have been discovered anywhere on Ikos itself. Their dating is determined by the general chronological context of the Alexandropol feast, i.e. to the third quarter of the 4th century BC.

In conclusion, it is worth remembering that the Alexandropol near-kurgan feast represents a closed archaeological complex. After the completion of the feast, the entire platform where it took place was covered with a mound around a metre in height, which precluded any later additions. Judging by the stable characteristic trait set for each of the series, the amphorae series in the Alexandropol feast represent single issue batches. The finding of the black glazed pyxis in the central tomb of the kurgan sets the lower limit of the dating of the amphorae to the mid-4th century BC. Some of the types of the amphorae present in the feast, such as Murigiol, Ikos, Melitopol-type Mende, Solokha I, the conical amphorae of Chian, Thasos Topraisar types, Chersonesus type III amphorae, mimicking those of the Melitopol type Mende, set an upper limit on the feast dating to the third quarter of the 4th century BC. Finally, the dating of the Sinope mark, to around 340 BC, being the most reliable of all the marks in the Alexandropol feast (Heraclean, Chersonesus, Thasos), most likely points to the dating of the Alexandropol kurgan, including all of its tombs and feast, to within the decade of 340–330 BC.

The construction of the Alexandropol kurgan

As a result of the new excavations of the Alexandropol kurgan in 2004–2009, new data were gathered which allow a better understanding and clarification of some of the information yielded by the 1852–1856 excavations, and when combined may be summarised as follows.[88]

The volume of discarded spoil heaps of the Alexandropol kurgan which survive on the southern, eastern and western sides totals 107.330 m^3. Taking into account the tachometric measurements of these three sides, the volume of the spoil heaps on the northern side, unfortunately mostly destroyed by the modern construction of a granary, would have attained a minimum of 23,000–25,000 m^3. The overall volume of discarded spoil at the Alexandropol excavation site is therefore calculated as at least 130,000 m^3, which is generally consistent with the soil still *in situ*. The most likely height of the Alexandropol kurgan would have been 23–24 m, surrounded by a retaining wall with a diameter of 80 m and a ditch with a diameter of 110 m. The Alexandropol kurgan is conical with a wide flat summit measuring about 19 m across. The best representation of its original form is given in a drawing made by Duke A.A. Sibirsky in 1852 at the very beginning of excavations that year (Figure 23).

The building material of the kurgan mound

Like the remainder of Scythian kurgans, the Alexandropol kurgan was constructed with turf sods, a fact noted throughout the 1852/53 excavations. This required an even extraction of just the turf layer from the ground, without penetrating deeper into the soil.[89] The surface of one such 'chunk' of humus, 25 x 17 cm would be around 425 cm^2, or 0.0425 m^2=23.5 units (averaged 24), around 118 units at 0.2 m thick in a cu m. This means that a mound with 130,000 m^3 could fit (at 25 x 17 x 20 cm) 130,000 x 118= 15,340,000 units. Their combined area would be 15,000,000 x 0.0425 = 651,950 m^2. The area therefore required for their extraction would have been as much as 65.2 hectares.

Stone cladding

The surface of the kurgan was originally completely covered with stone cladding, which covered 'all of the necessary sides of the grave up to its very top'.[90] At the top of the kurgan there once stood a stone statue of unknown function, either Scythian or Polovets.

Bank

The kurgan was surrounded by a soil bank measuring around 0.9–1.1 m high, and the width of the bank varied between 6.5 and 20 m. The bank and ditch were crossed by passages, 3.6 m wide from the west and 4.1 m from

[85] Kats 2007: 434; Polin and Alekseev 2018: 444.
[86] Polin and Alekseev 2018: fig. 256, cats 538–62.
[87] Polin and Alekseev 2018: 444–49.
[88] Space analysis and labour costs calculation was carried out in the framework of a grant awarded to M.N. Daragan by the Alexander von Humboldt Stiftung on the following subject: 'Assimilation and Transformation of the Space at the end of the Bronze Age – Early Iron Age on the Northern Black Sea Coast: geo-information analysis of the transformation of settlement and burial structures'.
[89] Mozolevsky and Polin eds 2005: 246–49.
[90] Izvlecheniye 1855: 51–53.

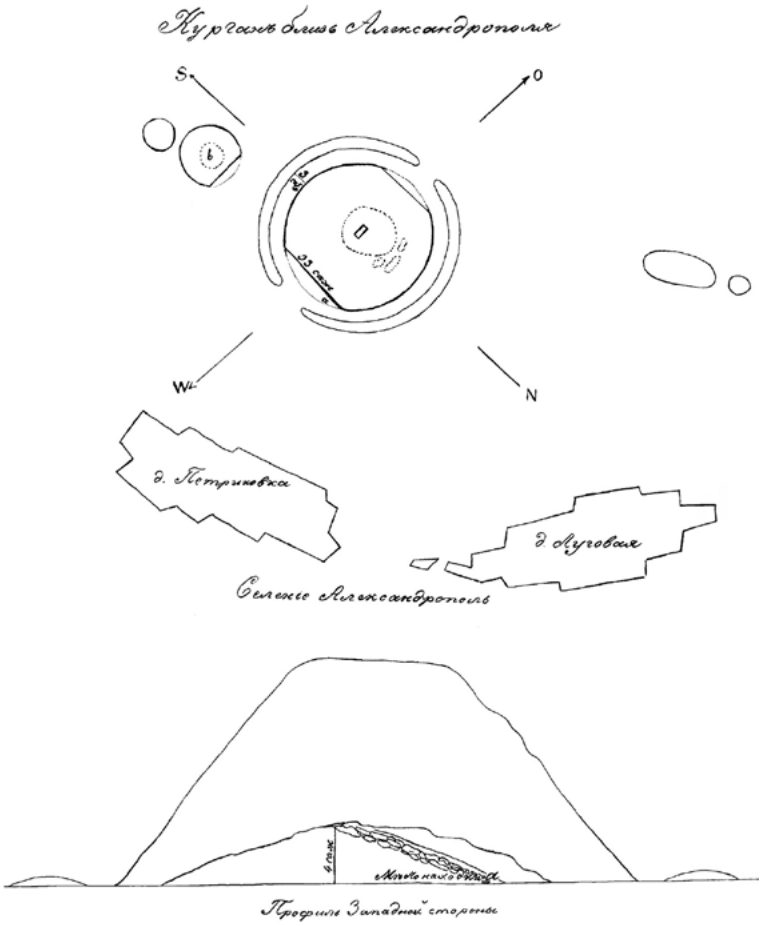


Figure 23. The Alexandropol kurgan in a drawing made by Prince AA. Sibirsky, dated 10 September 1852

the east. The bank was made after the feasting ceremony had concluded as it sealed its remains, effecting an act of closure.

Ring ditch

Between the bank and the kurgan was a ring ditch measuring 110 m in diameter, 4–5.7 m wide at ground level, 1.7-3.2 m deep below ground level and no less than 2.2–3.3 m deep from the ancient surface level. As evidenced by excavations of Scythian kurgans in the northern Black Sea region, the construction of the kurgan began with the excavation of the ditch. This marked the pre-kurgan area as the ditch separated the land of the dead from the land of the living. Only after this was completed were the graves dug. It is worth noting that the number of feasting objects in the ditch was rather low for a kurgan of this calibre, and only the parts of the ditch around the west passage had a higher concentration of objects, and on either side. In contrast, much smaller Scythian kurgans, two to five m high or smaller, often contain in their ditches a wealth of such remains, including sherds of amphorae and animal bones, but here instead the main part of the feasting remains lay beyond its ditch, and spread across a large platform on the western side.

Retaining wall

The cyclopean stone retaining wall which surrounded the edge of the Alexandropol kurgan was rather imposing in size, and by all accounts was originally vertical, standing over 4 m high and 85–90 m in diameter. It was constructed using massive stone blocks, so large that even 15 people are insufficient to lift one: of all the others known to us, the tallest retaining wall was found at Chertomlyk and was 2.5 m high. It would therefore seem that the ring wall of the Alexandropol kurgan presented an even more impressive sight, especially when considered that the mound was originally capped with an even stone shell, and it was unrivalled in the whole of Black Sea Scythia.

All of the stone kurgan structures at Chertomlyk used limestone and granite which had been quarried from 2–4 km to the east and 6–8 km to the north of the kurgan respectively.[91] The situation at Alexandropol was entirely different. A detailed study of Alexandropol gave us a collection of 32 samples from the retaining wall. The data on the type of stone and their origins allowed us to appreciate the grand scale of the work required in delivering a huge amount of stone to the kurgan site, and to re-evaluate the seemingly mundane building material as the stone of the retaining wall proved to be represented by as many as 11 geologically different types of stone. Apart from the prevailing granites and varieties of quartz, and a smaller percentage of limestone, there were examples of other types too, mainly crystalline, such as pebble and sandstone etc: the quarries for these were no less than 40–50 to 80–85 km away as the crow flies (Figure 24); another stone, a marbelised limestone, is possibly even of Crimean origin.[92]

It is notable that the distances, calculated in a straight line in no way reflect the actual journeys taken multiple times by Scythian carts delivering such an enormous amount of stone to the Alexandropol site. Taking into account detours to cross small steppe rivers, and the

[91] Alekseev, Murzin and Rolle 1991: 47.
[92] Nikitenko and Polin 2016; Nikitenko 2018.

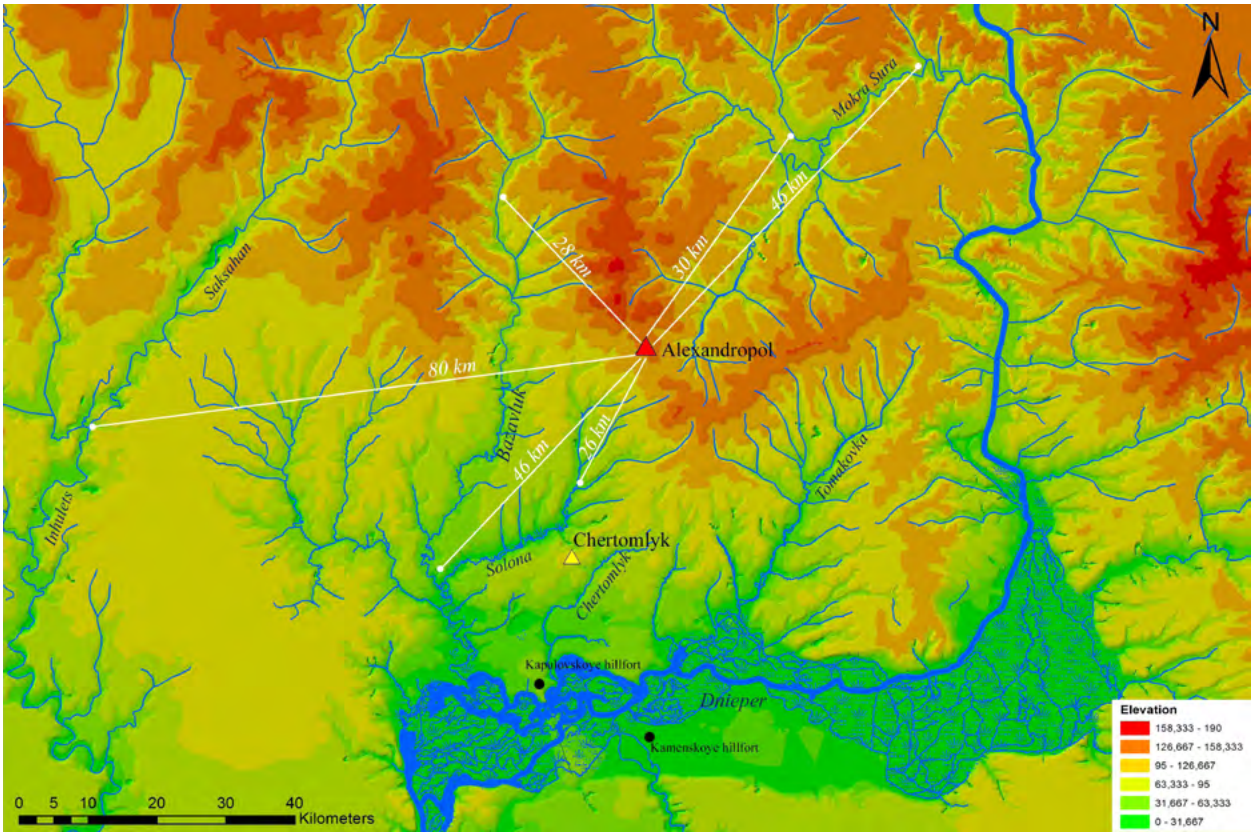


Figure 24. Alexandropol kurgan. The map of the stone quarries, and their distance from the kurgan site, for the purposes of building of the retaining wall

necessity to pick smaller, less steep roads to have the best chance of transporting the steppe timber on heavily laden carts, this distance at least doubles to 80 – 170 km. This means that the expenses on stone procurement at the Alexandropol kurgan must have been considerably higher than those at Chertomlyk, not to mention the substantial difference in the volume of the earthen mounds. This raises another interesting question: it was hardly necessary to have 11 varieties of stone for the retaining wall at Alexandropol as one or two would have been sufficient and those could have been brought from the nearest quarry. This means that these different types of stone, brought from many different areas and over long distances, may be seen as a form of offering, a tribute from subjugated peoples which was delivered from their own lands. In this context, it is particularly interesting to note the possible origin of one of the pebble varieties as the Crimea.

The volume of soil extracted from the ditch of the Alexandropol kurgan

The diameter of the ditch at the Alexandropol kurgan is 110 m. The excavated areas show that its depth would have varied somewhat. Thus, in the areas by the west passage it reached 3.2 m below ground level, while the remainder of the excavated areas showed that it was no more than 1.5–2.8 m below ground level, or 2–3.3 m from the level of the ancient horizon (Figure 7). Using ArcMap 10.2 software the unexcavated sections of the ditch have been modelled using the minimal parameters taken from the excavated sections. The volume of soil extracted from the ditch of the Alexandropol kurgan is therefore calculated as 1,228–1,500 m^3. These calculations were made taking as a starting point the surface level of the ditch, as recorded during excavations, and is consistent with the real tachometric readings. This means that the volume was even larger if one were to add the soil taken from the level of the ancient ground surface up to the ground level.

The volume of soil extracted during construction of the central tomb of the Alexandropol kurgan

It is important to point out a few additional features which underline the status of this kurgan, namely the depth and volume of the burial structure.[93] Contrasting with a number of other high elite kurgan structures, the Alexandropol kurgan comes across as rather modest in sale. The below-ground depth of the central tomb is 'only' 6.5 m from the pre-kurgan ground surface and such depths can sometimes occur

[93] Olkhovsky 1977: 109; Bunyatyan 1985: 41–42, 46.

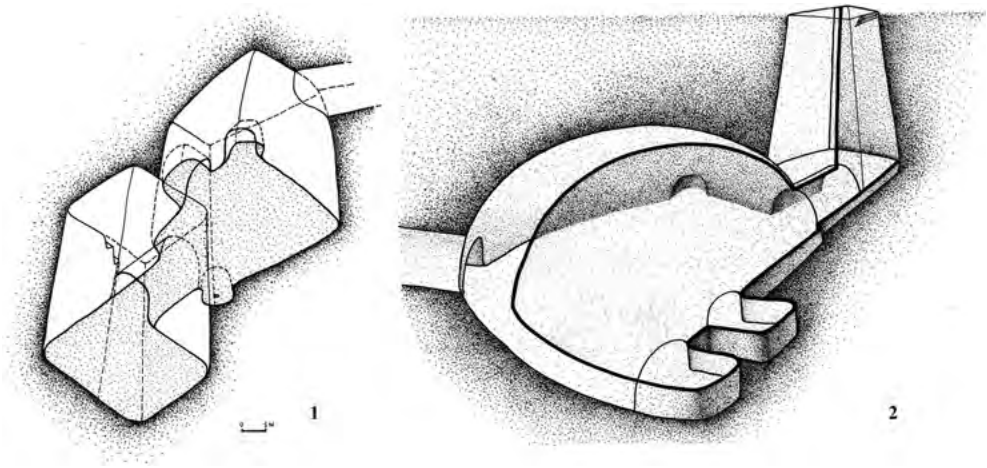
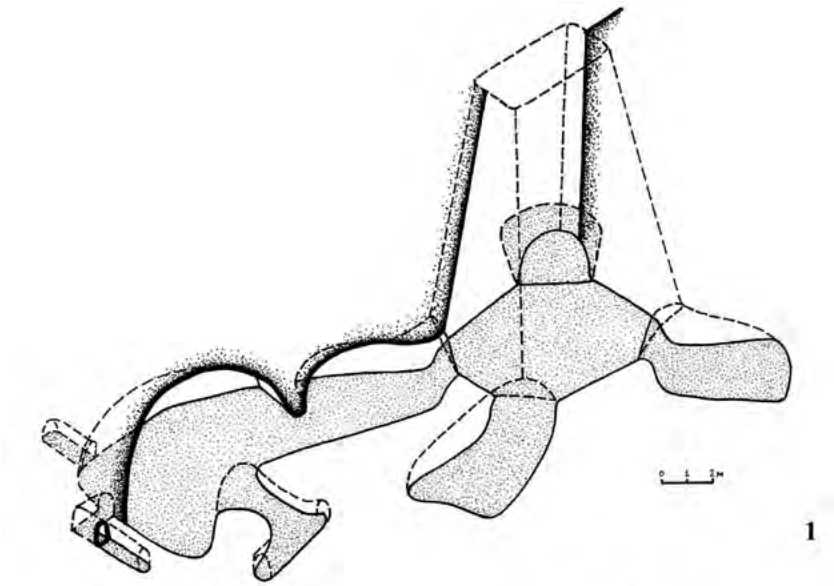


Figure 25. Central tomb of the Alexandropol kurgan: 1, axonometric view; 2, reconstruction



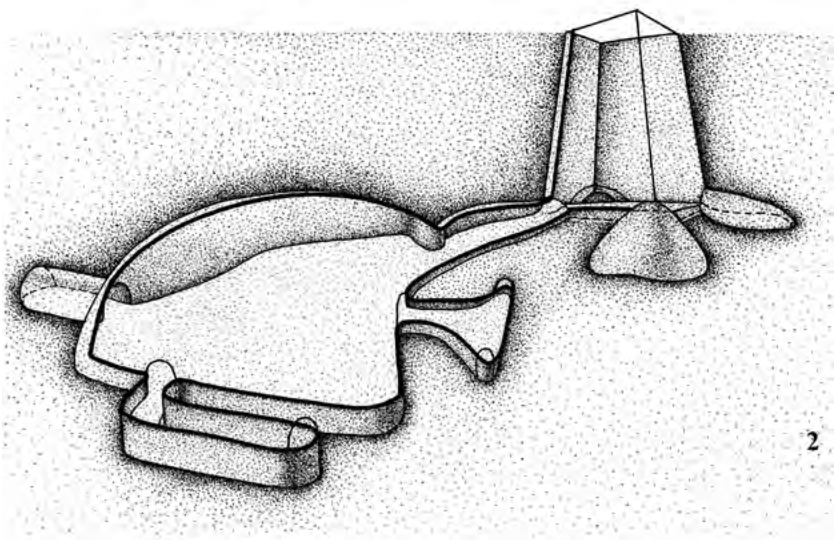


Figure 26. Central tomb of the Chertomlyk kurgan: 1, axonometric view; 2, reconstruction

even in common Scythian steppe burials (Figure 25).[94] Practically, however, this depth is based on local geological and hydrological considerations. Below the level of white clay into which these elite burials were excavated, there lies a water-resistant layer of red clay and, below that, at a depth of 8 m there is a water-bearing horizon, which strictly restricts the maximum depth of any underground structures in the area. It is for this reason, rather than any other, that the grave is relatively shallow.

[94] Bunyatyan 1985: tables XIV–XV.

According to our calculations, the total volume of the central tomb of the Alexandropol kurgan would have been 185.5 m^3, 109.2 m^3 of which would have come from the entrance pit, 8.7 m^3 from the dromos, 62.4 m^3 from the catacomb without niches, the 'cauldron' niche 0.95 m^3, the 'amphorae' niche 2.55 m^3, the northwest niche 1.75 m^3. By comparison, the German team working at Chertomlyk, a much larger kurgan with a complex branched footprint (Figure 26), calculated the volume of the central tomb alone to be 505 m^3, and its northern tomb 65 m^3.[95]

The spatial surroundings of the Alexandropol kurgan

Constructing the enormous mound at Alexandropol, as well as constructing the underground chambers, digging the ditch and building the impressive retaining wall, clearly required a large number of workers. This necessitates the assessment of the demographic profile of the surrounding micro-region. What then did the neighbourhood of this giant Alexandropol kurgan consist of in Scythian times?

To answer this question, we monitored kurgans in the near vicinity over a territory of 1,725.3 km^2. The geo-spatial analysis was carried out according to the principle previously used in studying the region between the rivers Bazavluk, Solenaya and Chertomlyk, which is adjacent to the Alexandropol micro-region to the southwest,[96] as part of the unified (GIS) project: 'The Kurgans of the Ukraine'. This area was also subjected to a large-scale kurgan survey, including cartographic analysis of all kurgans, both previously examined and unstudied (Figure 27), all with the aim of studying the local kurgan distribution and their temporal and spatial organisation.

Scythian burials have been found in 51 kurgans in this micro-region, 45 of which were actually constructed in Scythian times and in the remaining six cases Scythian burials were inserted into earlier Bronze Age kurgans (one in a kurgan of Srubnaya culture, and five in pit-era kurgans). Altogether 56 Scythian burials had been studied in this region. Apart from three which date to the end of the 5th and cusp of the 5th/4th centuries BC, the remainder were constructed in the 4th century BC. In cases where exact dating based on ancient pottery or arrowheads was possible, they could be dated more precisely to the second and third quarters of the 4th century BC.[97]

The nearest surroundings of the Alexandropol kurgan

In 1851–1856 in the immediate vicinity of the Alexandropol kurgan were found and examined four Bronze Age kurgans, two belonging to the 'long' type.[98] Modern monitoring of the kurgans in a 5 km radius around the Alexandropol kurgan revealed no more than 20 kurgans, 15 of which can be dated to the Bronze Age owing to their typical near-kurgan ditches. Widening the radius to 10–12 km takes in such substantial Scythian kurgans as Nechayeva Mogila, situated 10 km to the south/southeast from the Alexandropol. Lying 11.4 km to the south is the 10 m high Orlova Mogila (2.2 km from Nechayeva) and 12.3 km north/northwest is Chekeresskaya Mogila, standing 8 m high. These kurgans were situated in full view, i.e. from the top of the Alexandropol kurgan one could see both, the Nechayeva and the Chekeresskaya Mogilas, and according to A.V. Terecschenko, even Chertomlyk.

The survey of the vicinity of the first three of these kurgans produces a picture similar to that at Alexandropol. Similarly, there are few kurgans in the immediate vicinity and most date to the Bronze Age. One should note the presence of the 'long' type Bronze Age kurgans near Alexandropol, but also the Chekeresskaya and Nechayeva Mogilas. There are two 'long' kurgans close to Chekeresskaya Mogila.[99] It seems there were no 'long' kurgans near Orlova Mogila. Another notable point is the anonymous 'long' grave standing about 8 m high which is situated between the Alexandropol kurgan and the Chekeresskaya Mogila. Before the construction of the giant Scythian royal kurgans this would have been the largest kurgan in this micro-region. The other giant kurgans of the Bronze Age are all situated to the north, beyond the borders of the Alexandropol micro-region.[100] There is also a 'long' grave near the Krasnokustsky kurgan. Despite there having been almost no kurgan excavations in this micro-region, the pattern and number of the kurgan groups, and the number of kurgans within each group, allow them to be dated to the Bronze Age. This allows us to say with some certainty that this micro-region saw no ordinary Scythian burials but was reserved for the funerals of the highest Scythian elite.

This becomes even more apparent once one widens the search radius from the Alexandropol kurgan to 25–35 km. To the north of the Alexandropol kurgan, apart from the Chekeresskaya Mogila mentioned earlier, there are no large Scythian kurgans. There are also no excavated kurgans in this direction, thus the pattern of Scythian burial distribution is unconfirmed, but the prevalence of small disparate kurgans points to their Bronze Age date. No research has yet been carried out to the west within this radius. The only large Scythian

[95] Gauglitz, Jäger and Jäger 1998: 87.
[96] Daragan 2014: 378–79.
[97] Daragan 2018.
[98] Polin and Alekseev 2018: 28–37.
[99] Daragan 2013: 79, 81, fig. 3.1–2.
[100] Daragan 2014: 391, map 32.

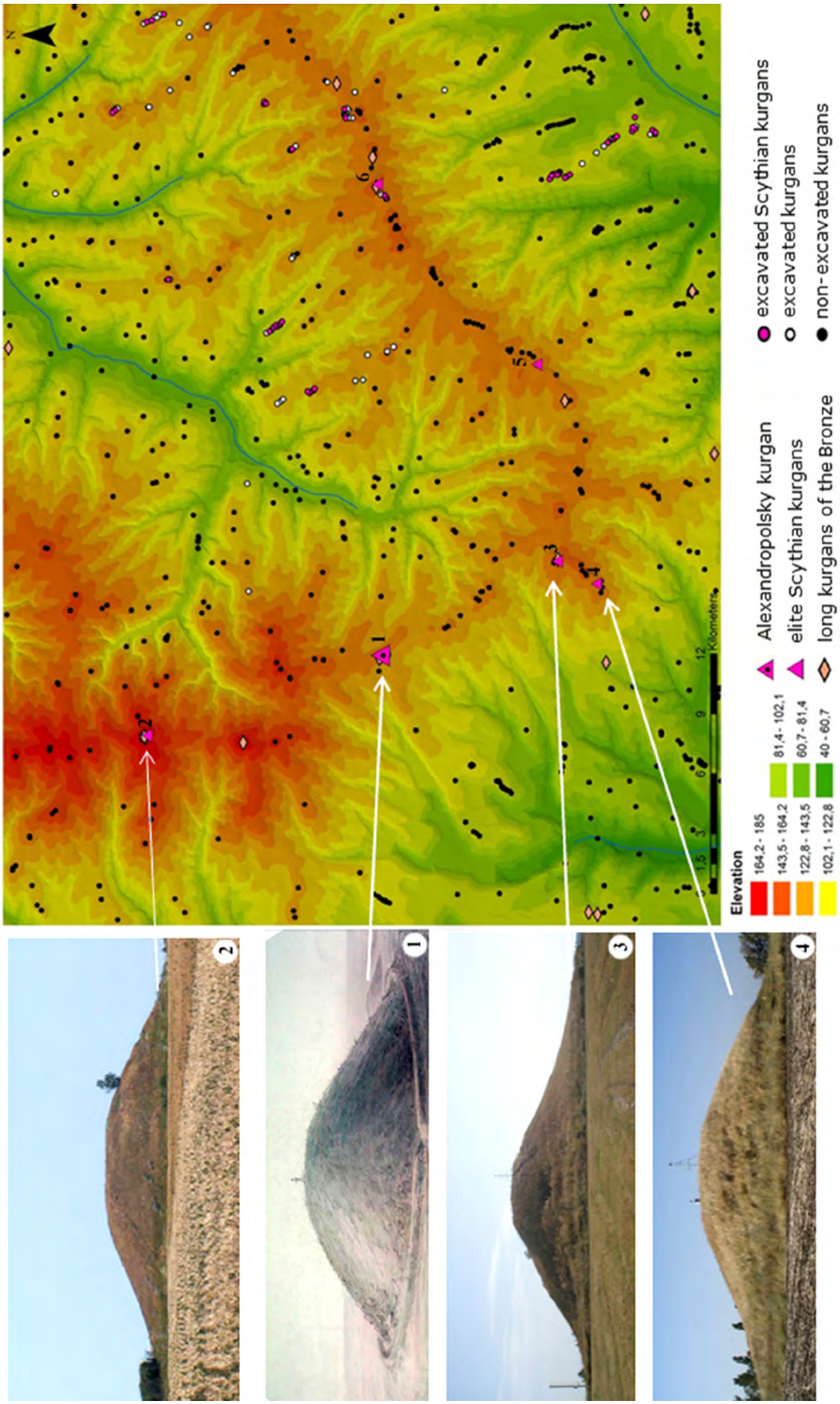


Figure 27. Distribution of kurgans in the Alexandropol kurgan micro-region

kurgan, situated 22.3 km to the east of Alexandropol, is the Krasnokutsky kurgan. To the east or southeast of the Alexandropol micro-region, the density of small Scythian kurgans gradually increases and this becomes more pronounced the closer one gets to the Dnieper. Thus, the closest examined kurgan complex to that at Alexandropol is close to Novopokrovka village, and consists of 21 kurgans, 10 built in Scythian times. Further to the southeast, near Kislichevataya village, there are 30 kurgans in five groups, 19 built in Scythian times, and two others re-used Bronze Age burials. The prevalence of Scythian kurgans is also observed further to the east. The Glukhovo village (Marganets district) area includes 29 studied kurgans, 20 of which are Scythian. The Vysshetarasovsko village area accommodates 71 kurgans, studied between 1974 and 1976, 47 of which are Scythian, and two re-using Bronze Age mounds. The Stryukovka, Vladimirovka, Maryino, Dolinskoe, Sadovo, Mirolyubovo, Vyvodovo village areas contain 25 Scythian burials out of the 48 studied. The Novoye Zaporozhye village has 10 out of 16.[101]

Similar data have been gathered from the deltas of Bazavluk, Sollenaya and Chertomlyk to the southwest of the Alexandropol micro-region, from where 144 out of a total of 234 examined kurgans proved to be of the Scythian period.[102] It is worth noting that around 50 of the lesser Scythian kurgans in this region were grouped around the immediate vicinity of the giant royal kurgan Chertomlyk. Other larger Scythian kurgans also had subject kurgans, as was the case with the Strashnaya and Sobolaya Mogilas. This means that the system at play here is entirely different from the immediate kurgan surrounding of the Alexandropol kurgan. The territories to the east, south and west of the Alexandropol micro-region show a distinctly denser cluster of Scythian burials, compared with their rather sparse presence in the surroundings of the Alexandropol kurgan.

There are significant differences here too in respect of the chronology. While the territories to the east, south and west of the Alexandropol micro-region contain kurgans dating almost exclusively from the second half of the 5th to the first half of the 4th centuries BC,[103] the few examined Scythian kurgans of the Alexandropol micro-region date only to the 4th century BC, and more specifically mainly to the second and third quarters of that century. Thus, the examined Scythian burials of the Alexandropol micro-region date precisely to the same period as, or immediately before, that of the construction of the Alexandropol kurgan. This points to the absence of a settled population in this region before the 4th century BC, and the area of the Alexandropol kurgan being practically empty in the 4th century BC, raising the possibility that this area had some sort of sacred status with a taboo on its use. Doubtless the Alexandropol kurgan was erected using slave labour, which judging by the kurgan's location would have been brought from a considerable distance from the intended site. Examining the place of burial of the main occupant of the Alexandropol kurgan as a place of his possible origin, one has to conclude that his subjects would have been dispersed across the larger part of the steppe on the right bank of the Dnieper.

How much wine was consumed by the attendees of the feast?

Continuing the study of the Alexandropol kurgan allowed for the discovery of the near-kurgan feast, where we discovered no less than 457 Greek amphorae examples of 14 different types, and made in 13 different centres of production. If one includes similar finds from the previous excavations of 1855/56 and 2009, the total number of amphorae found in the Alexandropol kurgan comes to 479 vessels. An average count which takes into account the standard volume of an amphora – for the types where it is known – shows that the attendees of the feast consumed between 5,663 and 7,242 litres of imported Greek wine, excluding local beverages, the consumption of which is also demonstrated by fragmentary pottery flasks.

These data raise the question of the transportation of such an amount of wine to the remote steppe. The total of 479 amphorae from the central tomb and funerary feast amounts to no less than a sixth of the capacity of a single ship as the 'Patrokl'.[104] How would one go about delivering all of this to the steppe? And where from? In addition to the weight of 6,000 litres of wine one should add the weight of the amphorae themselves. Our estimates suggest that the weight of a complete Heraclean pithoid amphora would be around 7–10 kg, conical Heraclean 8–10 kg, Ikos 10–13 kg, Chian 15 kg, Mende 15 kg, Peparet 10–12 kg. With the average weight of 10–11 kg, the overall weight of the wine and containers could have been around 10–11 tons. Undoubtedly, this would have been a one-time bulk order, which is evident as the amphorae from the feast belong to a single type, often with the same maker's mark, which suggests that they were all ordered simultaneously. Where from and how were these delivered? We do not know where the wine was bought. Was it from one of the many Greek centres, the nearest being Olbia, or was it from one of the Scythian settlements of the lower Dnieper, such as the Kapulovskaya or Kamenskaya hillforts? The nearest of these – the Kapulovskaya hillfort – would have

[101] Daragan 2018.
[102] Daragan 2014: 382, table 2.
[103] Polin 2014: 216–23, 238–39, 268–70, 333–36, 341–42, 343–46, 362, 371–86, 410–11.
[104] This was the name of the mid-4th century BC Greek vessel given to it by its researcher A.I. Tereshchenko (2013).

entailed an overland trip of 55 km in a straight line, and at least double that on actual roads.

How much meat was consumed by the attendees of the feast?

Using as a starting point the amount and weight of meat consumed at the Tolstaya Mogila feast, V.I. Bibikova calculated the number of attendees to have been between 1,300 and 3,000 people.[105] Applying her method, and the standard weight of an animal carcass calibrated according to the species present in the Tolstaya Mogila feast, as well as the amount of meat consumed by one person as between 3 and 5 kg, let us attempt to calculate the number of attendees at the Alexandropol kurgan funerary feast. The excavated remains belonged to as many as 16 cows or bulls, 71 horses, seven sheep and goats, two domesticated pigs and a deer. According to the data gathered by V.I. Bibikova the average weight of a horse for the slaughter would have been around 160 kg, and a deer 75 kg.[106] Contemporary data place the slaughter weight of a cow/bull at around 330 kg, a sheep around 40 kg, a goat 25 kg, and a pig at 140 kg. We know that in Scythian times domestic stock were smaller, and therefore lighter, than their modern counterparts. Considering the incomplete nature of our calculations of the total number of the animals consumed at the feast, as the data from the 1852–1856 excavations is missing, we can assume that the margin of error is compensated for by the modern carcass weight standards. We therefore conclude that the overall weight of meat consumed at the Alexandropol feast would have been around 17,240 kg which, assuming the portions were 3–5 kg per person, allows us to estimate about 3,500–5,780 individuals present. Naturally, these figures are far from certain but they do show the number of attendees was very large and in four figures.

The length of time taken to construct the Alexandropol kurgan

Taking as his starting point the calculations of V.I. Bibikova, B.N. Mozolevsky determined the length of time taken to construct the Tolstaya Mogila kurgan which, according to his calculations, would take 3000 people between four and eight days. He based this on the fact that one worker in one day can prepare 1 cu m of soil and deliver it to the kurgan with two trips of a trolley accommodating 500 kg.[107] These calculations are hardly reliable however. Just as with any Scythian kurgan, the construction of Tolstaya Mogila required not just piles of soil, but chunks of turf, which has a much higher labour intensity. Thus, the main question becomes – how long would it take 3000 people to prepare, deliver and place in a particular structural order 12,000 m^3 of steppe turf? The Scythians did not have metal shovels, so extracting the turf would have had to be done with small iron hoes and tools similar to a small axe, using any supplementary tools they could get hold of, such as wooden spears, wooden shovels designed only for scooping up already excavated soil, and trowels made from animal shoulder blades.[108] We have no way of determining the efficiency of these implements.[109] The authors' own experience suggests that cutting turf from the virgin steppe, even with the help of a modern shovel of sharp steel, is one of the hardest forms of labour and requires an enormous amount of effort and time as this turf contains an incredibly developed root system, and separating it from the soil below is backbreaking. It is therefore unrealistic to imagine the 10 m high mound of Tolstaya Mogila, being raised in four to eight days.

A similarly modernist approach was taken with the calculations of R. Rolle, of the time taken to construct the Chertomlyk kurgan, which was somewhat smaller than the Alexandropol kurgan. She determined the volume of the Chertomlyk kurgan as being 80,000 m^3, of which 75,000 m^3 was built of turf. Through comparison with modern standards of turf-cutting, R. Rolle suggested that even in Scythian times a worker could prepare 2 m^3 of turf in a given day. Using simple calculations, one might then assume that 1,000 men could construct the mound of Chertomlyk in 35 days. It is generally believed, that the entire work cycle at the kurgan site, including digging the underground burial structured, constructing the mound of soil and the stone wall around it, depending on the number of workers, could have been completed by a hundred men in 160 days, or 20 days if the number of workers was as many as 700.[110]

It seems unlikely that an ordinary Scythian worker could actually have prepared 2 m^3 of steppe turf in a single day as they lacked metal shovels. The efficiency of the tools that they had access to is unknown, and therefore such calculations lack factual support. However, one thing is certain: the entire construction cycle of the massive mound at Chertomlyk must have been completed within the time constraints of the warm season, which in the steppes of the northern Black Sea region lasts between April and October – i.e. six or seven months – sometimes extending to November in warmer years. However, neither October or November are reliable when it comes to weather as there can be prolonged bouts of rain, occasional frosts and snow. The Alexandropol kurgan was even more colossal in

[105] Bibikova 1973: 67.
[106] Bibikova 1973: 67.
[107] Mozolevsky 1979: 167.
[108] Such trowels were used for piling loose soil into containers to be raised to the surface and were frequently left in the catacombs.
[109] Mozolevsky and Polin eds 2005: 254–58, figs 130–31.
[110] Rolle, Murzin and Alekseev 1998: 60–65, fig. 24.

size. Given its height of around 24 m, basal diameter of 95 m and top diameter of 18 m, the total volume of the mound was 130,000 m^3. The width of the turf chunks used in building Scythian kurgans would have been 0.25 m, the area of steppe needed to extract the turf thus around 65.2 hectares. As well as that, it was necessary to prepare and deliver an astounding amount of rock of different types sourced from different and rather remote quarries in order to construct the cyclopean wall and stone cladding over the entire kurgan. The estimation of the number of people taking part in the Alexandropol funerary feast stands at around 4,000–6,000 individuals and, judging by the composition of the bodies buried in the debris, there were men, women and children. As with Chertomlyk, one can only guess at the contemporaneity of the tombs, the mound and the funerary feast at Alexandropol, but all of the work must have been completed during the warm seasons, within six or, at most, seven months of one year.

Conclusions

The results of the most recent excavations of the Alexandropol kurgan, spanning six long seasons from 2004 to 2009, provide a wealth of new data for dating the kurgan and understanding its construction. Moreover, these significant new scientific results allow a completely new understanding of this important monument of the Black Sea Scythians. They finally allowed determination of its exact dating, clarification of the structure of the central tomb, and calculation of the metric area of the ditch surrounding the kurgan and its central tomb. However, the main achievement was the discovery of the massive near-kurgan funerary feast which has completely changed our interpretation of the area surrounding the kurgan, and raises new questions for future investigations. All the existing data on kurgan construction, the uniformity of the gold plaques, amphorae and makers' marks from the tombs in the kurgan, its mound, ditch and near-kurgan funerary feast indicate the contemporaneity of all the tombs and structures of the Alexandropol kurgan. The numerous types of amphorae and their marks from the mound, tombs and feast date to within the third quarter of the 4th century BC, *c.* 340–330 BC.[111] Finally, a new study of the entire corpus of such finds from other Scythian kurgans allow us to propose that steppe Scythia in the northern Black Sea region ceased to exist no later than the end of the 4th century BC.[112] The reason for this is unknown but possibilities include climate change or epidemic. The steppes of the northern Black Sea regions remained desolate for almost a century until the Sarmatians appeared from the east in the 2nd century BC.

[111] Polin 2010; 2014: 490–99; Polin and Daragan 2010; 2011.
[112] Polin 2014: 645.

New investigations of Scythian kurgans and their periphery in the lower Dnieper region: non-destructive measurements and archaeological proof

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Abstract

Non-destructive studies of Scythian kurgans and their periphery in Dnipropetrovsk region of Ukraine applying geophysics and GIS methods were aimed both at targeting archaeological excavations and establishing the spatial structure of the monument and obtaining new data on Scythian funerary rite. The periphery of the Scythian kurgans contains many valuable evidences, in particular the remains of the funeral feast, which are often left out of the attention of scientists. In 2017, a high-resolution geomagnetic survey of 3.65 ha was performed at the Scythian burial ground Yekaterinovka. Magnetometry showed the presence of kurgans not visible on the surface, as well as a series of other features located beyond the kurgan ring ditches. In 2017, five kurgans were excavated, four of which could not be detected visually during surface inspection but were traced by magnetometry survey. A completely new episode in the understanding of the construction of Scythian kurgans and the organisation of their space was the discovery of a Scythian period ring ditch, without a burial, included in the structure of the Scythian burial ground, as well as grooves in the parent loess from which the builders took earth for the kurgan mounds, near three kurgans without the ring ditch. Ground survey of kurgan Novokhortitsa-1 revealed fragments of a pole top to the west of the magnetic anomaly, whose source is the main burial of the kurgan. These finds confirm the regularity of the location of the funeral feast in the structure of kurgan monuments and indicate the need for further study of their periphery.

Keywords: Kurgan; periphery; magnetometry; Scythian period

Introduction

Burial monuments (kurgans) provide the main source of information for the study of Scythians. Some of these contain impressive burials of members of the Scythian elite, hidden within mounds rising to a height of up to 24 m and as much as 110 m across. Scythian kurgans are located either singly or in groups, the latter forming entire cemeteries. Our ideas about funerary rites and many other spheres of Scythian life directly depend on the manner and quality of study of these kurgans which entails both the study of the burial assemblages, the mounds themselves and their surrounding space, or kurgan periphery.

Over the last half century of intensive excavation of Scythian kurgans in the northern Pontic region, a wealth of information has been gathered which provides an overview of the structure of kurgans, their building materials and manner of construction. Speculation on the political and social structure and ideology of Scythian society are based on the same data. However, during the excavations of these kurgans, for a long time researchers have neglected the study of the structure or construction of the mound, the excavation of the kurgan ring ditch was considered unnecessary and remnants of funerary feasts were left unstudied. However, there has been a gradually growing appreciation of the high potential level of information offered by the analysis of these elements of Scythian kurgans and the need for a thorough investigation, not only of mounds and burials, but also of the ring ditch and funerary feast.

A completely new idea about the content of the Scythian funerary rite was obtained during the additional study of the Scythian royal Alexandropol kurgan in 2004–2009 by the expedition of the Institute of Archeology of the National Academy of Sciences of Ukraine directed by S.V. Polin. This mound and its underground construction were initially studied between 1852 and 1856. The study of the funerary feast of the Scythian royal Alexandropol kurgan was carried out in full. The remnants of the funeral feast were found along the western side of the kurgan outside the ring ditch at the level of the ancient ground surface. They were located in a linear zone up to 15 m wide and about 120 m long, up to 40 m north of the western passage into the ring ditch and about 80 m to the south

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of it. Finds from this feast included fragments of at least 457 Greek amphorae, animal bones originating from 99 individuals, several scattered fragments of human bones, sherds of Scythian handmade pottery, bronze and iron arrowheads, bronze and iron parts of horse harness, iron nails and staples, decoration and gold clothing appliqués. The discovery of 11 accompanying human burials was unique and represent those killed during the feast itself.[4]

Similar feasting zones in the vicinity of large Scythian kurgans were previously known from the Babina Mogila, Vodyana Mogila, Gaymanova Mogila and Zheltokamenskaya Tolstaya Mogila kurgans but all of these had been destroyed by ploughing and were identified only by scattered surface finds of fragmentary amphorae and animal bones, and none have been investigated further.[5] The discovery of a major funerary feast at the Alexandropol kurgan compelled us to completely re-evaluate assumptions regarding the Scythian kurgans and their peripheries as none of those in the northern Pontic region had been explored outside the ring ditch, and even these ditches have not been excavated. We must sadly conclude that not a single Scythian kurgan in the northern Pontic region has yet been fully explored.

The fact that the periphery of nomad kurgans are saturated with various traces related to funerary feasts, not only in this region, but across the entire Eurasian steppe, became clear after the geomagnetic survey of kurgans and surrounding areas by German colleagues in the territories of Kazakhstan, Tuva, Khakassia and the northern Caucasus. Using high-resolution magnetometry these researchers were able to rapidly investigate large areas without excavation, obtain detailed information on the structure of both the kurgans and their periphery and in particular, locate ditches, fire-places, burials, ritual complexes, feasting residues and traces of construction on the periphery of some of the large kurgans.[6] The only previous case where magnetic survey has been conducted on kurgans in the steppe zone of Ukraine was that of the Mamai Gora kurgan group in Zaporizhzhya region.[7] Specialists from the Institute of Geophysics of the National Academy of Sciences of Ukraine, together with Frei University (Berlin, Germany)[8] and Taras Shevchenko University of Kyiv,[9] conducted magnetic surveys on individual kurgans in the forest-steppe zone, and an international team directed by T. Smekalova performed magnetic measurements on three Scythian kurgans in the Besh-Oba group in the Crimea.[10] This paper reports the results of new geophysical investigations carried out in 2017 in the kurgan burial ground Yekaterinovka near the town of Pokrov (the former town of Ordzhonikidze) in the Dnipropetrovsk region, as well as the Novokhortitsa-1 kurgan near the city of Krivoy Rog in the heart of steppe Scythia. Particular attention was paid to the periphery of kurgans and the results proved to be highly instructive.

Study areas

Yekaterinovka

This kurgan field near Yekaterinovka village is located in a watershed between the Bazavluk, Solyonaya and Chertomlyk rivers in the lower Dnieper region (Figure 1). The investigations of this burial ground were commenced by the Ordzhonikidze expedition of the IA NASU in 2003. At that time, two Bronze Age kurgans in the western part in front of the Shevchenko manganese quarry, and two Scythian kurgans dating from the second quarter to the middle of the 4th century BC and located in the eastern part of the burial ground, then already within the northern quarry zone, were investigated.[11] The study of this burial ground was continued in 2017 and 2018. Over an area measuring 200 m to the east of the previously studied Scythian kurgans, only one kurgan was visible on the surface but two more were determined from satellite images. However, there were no traces of kurgans on the ground, either visible in relief or as soil marks in the ploughed ground. Assuming difficulties in finding kurgans, especially beneath the present crop of sunflowers, a geomagnetic survey was undertaken.

Novokhortitsa-1

The group of kurgans, the largest being Raskopanaya Mogila, is situated on the watershed steppe plateau near Novokhortitsa village in the Sofievka district of Dnipropetrovsk region (Figure 1). It consists of the Raskopanaya Mogila kurgan (height 3.7 m, dimensions 53 x 66 m) and four small kurgans measuring up to a metre in height and located to the southeast/east. In 2016 two more heavily ploughed kurgans standing half a metre high were found southwest from the Raskopana Mogila and identified by a spot of yellow earth which contrasted with the surrounding black chernozem ploughland. There were up to a dozen small sherds of amphorae on the western sides of both kurgans, i.e. traces of funerary feasts which had been disturbed by ploughing. A large fragment of a bronze pole top with an almost complete two-sided image of a griffin was

[4] Polin 2011*a*; Polin and Daragan 2011.
[5] Polin 2011*a*.
[6] Samashev *et al.* 2009; Parzinger *et al.* 2015; Parzinger, Gass and Fassbinder 2017; Fassbinder *et al.* 2015*a*: 81–88; 2015*b*; Fassbinder 2016.
[7] Smekalova and Chudin 2009.
[8] Zöllner, Ulrich and Rolle 2007; Orlyuk *et al.* 2016.
[9] Bondar and Bashkatov 2014.
[10] Smekalova *et al.* 2005.
[11] Polin *et al.* 2008; Polin 2011*b*; Chernykh and Daragan eds 2014: 102–103.

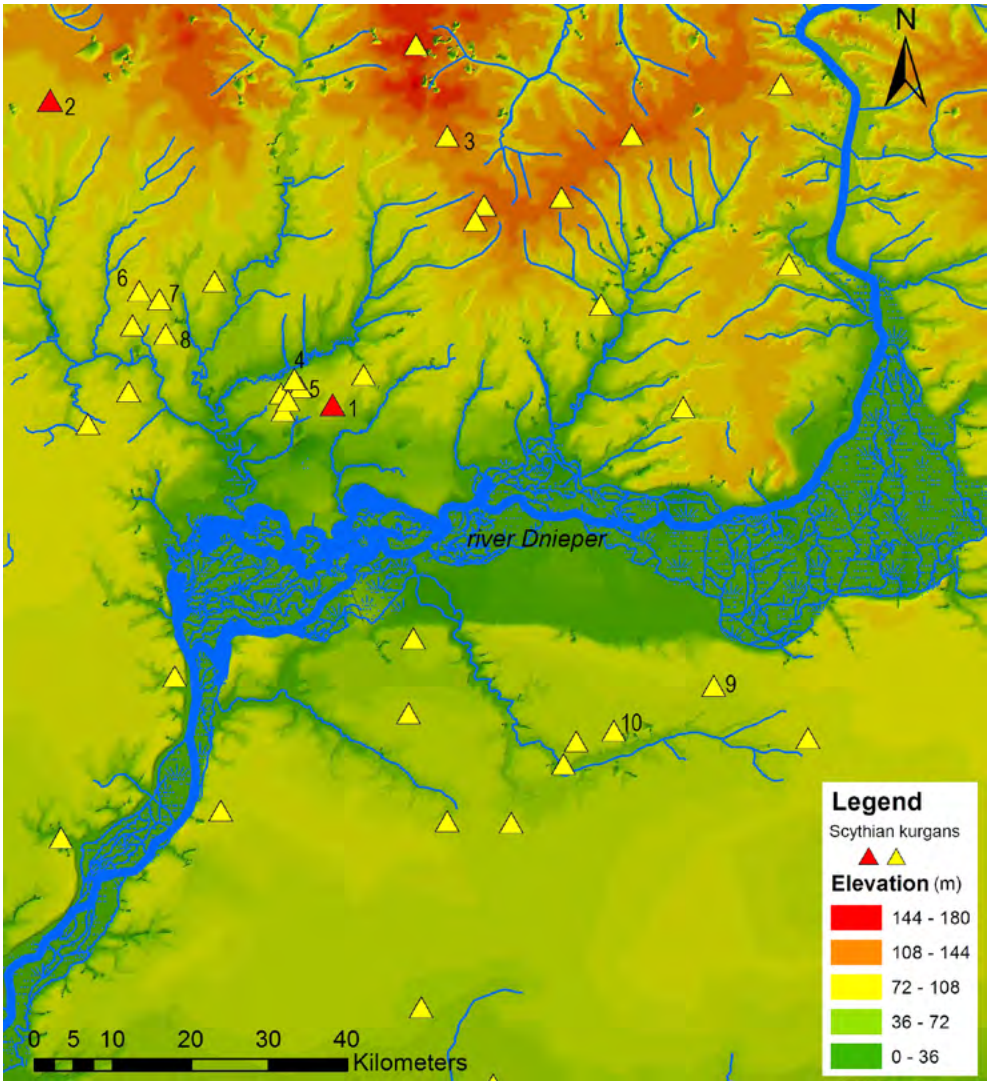

Figure 1. Scythian kurgans in the lower Dnieper region: 1, Yekaterinovka kurgan burial ground; 2, Novokhortitsa-1 kurgan; 3–10, Royal Scythian kurgans with funerary feasting remains found on their periphery

found on the surface of kurgan 1 (Novokhortitsa-1), in addition to amphora sherds (Figure 2).

Methodology

A ground-based tacheometric survey was performed with the use of Total Station / Trimble M3 5' device for digital terrain modeling. Geodetic referencing was made using GPS receivers GNSS System Trimble Geo XR, GNSS System Trimble Geo XH. The survey was performed in the RTK mode. At the Yekaterinovka burial ground measurements of the total intensity of the geomagnetic field were performed using optically pumped cesium vapor magnetometers PKM-1 (Geologorazvedka, Russia). The magnetometer consists of a single probe with an automatic data log on a handled controller. The magnetometer has a sensitivity of ± 0.01 nT. Field measurements were carried out with spatial resolution of 0.5 x 0.15 m. During the work the need to register time magnetic variations became clear. However, as the observation site was only 400 m from the manganese ore quarry, the irregular magnetic noise caused by mining and earth-moving machines badly affected the recording (Figure 3a–d). Technogenic magnetic variations turned out to be comparable in time with the duration of passing of one survey profile by its operator. The intensity of these variations often exceeded the intensity of target anomalies. The same magnetometer was utilised to record variations during survey. It operated in the same sampling rate as the main magnetometer, i.e. 10 measurements per second. At the processing stage the variation record, interpolated by the Akima spline, was subtracted from the measured values along the profile. Processing procedure of withdrawal profile linear regression from the measured values allows the exclusion of the normal field caused by geological structures, as well as from daily variation of the geomagnetic field. A low-pass filter was applied to remove the high frequency noise with the resulting output being a smoother grid. The difference was then influenced by the target archaeological structures, pieces of magnetic rubbish and ploughing effects as well. The magnetic intensity values were interpolated in the regular grid 0.50 x 0.50 m and represented in grey

Figure 2. Novokhortitsa-1: bronze pole top from the near-kurgan funeral feast

scale, dynamics -3.0/+3.0 nT. On the Novokhortitsa-1 kurgan, the magnetic survey was carried out with the same magnetometer with spatial resolution of 1.0 x 0.15 m. The magnetic intensity values were interpolated in the regular grid 0.50 x 0.50 m and represented in grey scale, dynamics -5.0/+5.0 nT.

Interpretation of magnetic measurements and results of archaeological excavations at the Yekaterinovka cemetery

The advantages of using non-destructive methods in the study of archaeological monuments are widely known and much discussed, but it is important to also conduct limited archaeological excavations in order to test the results and increase the reliability of interpretation of spatial reconstructions offered by the geophysical and geo-information data. A qualitative interpretation of geophysical anomalies should always be confirmed through archaeological excavations and the collection of surface finds, and our research is based on this principle.

At the Yekaterinovka site we conducted geomagnetic survey, tacheometry and GPS-referencing on three plots covering a total area of 3.65 hectares (Figures 4–5).

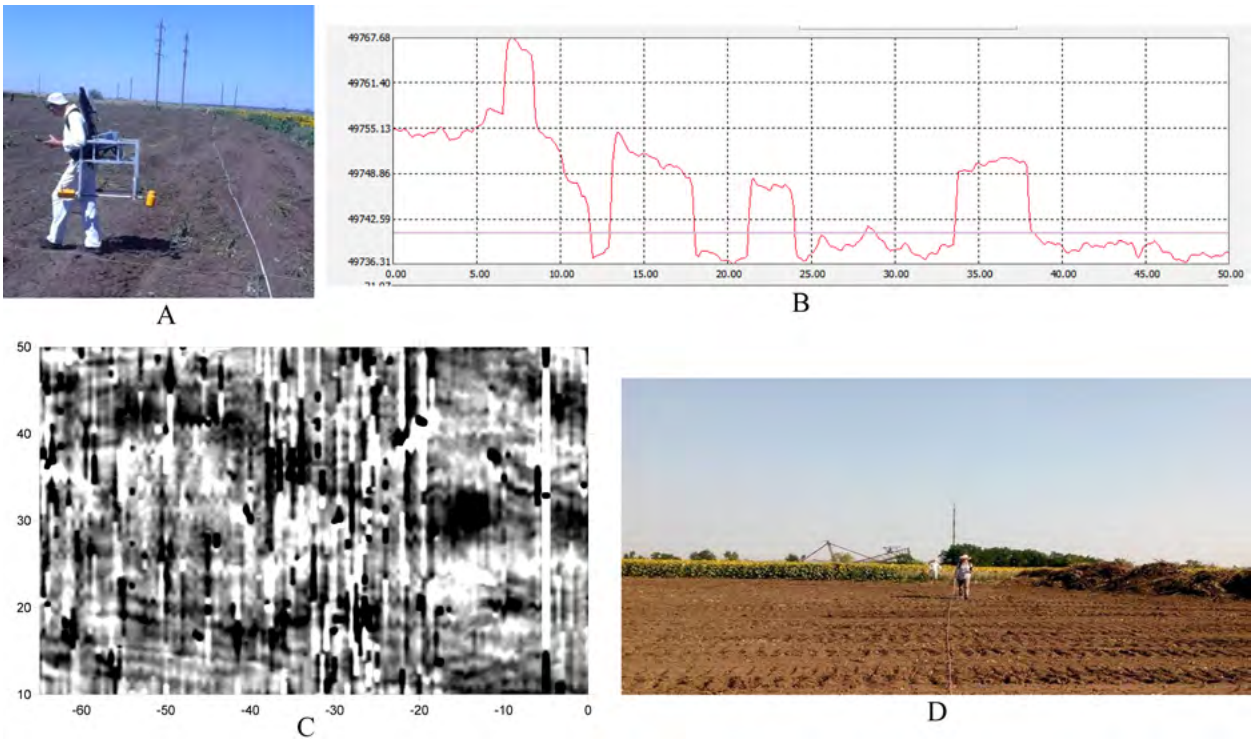

Figure 3. Yekaterinovka burial ground: magnetic survey with two caesium magnetometers fixed on an aluminium frame and horizontally spaced 0.5 m apart (A); graph of single raw profile demonstrating technogenic noise in magnetic induction record (B); portion of magnetogram without correction of technogenic noise (C); photograph of study area demonstrating rotor excavator in the quarry nearby (D)

Figure 4. Satellite image of Yeraterinovka burial ground: the locations of individual kurgans are traced and the magnetometry plots are marked as red polygons

Individual anomalies and their clusters, which were presumably associated with ancient burial structures, were recommended for excavation based on magnetic anomaly maps. Archaeological features identified through magnetometry occupy a strip measuring 30–50 m across and over a km in length. The proposed interpretation included 17 supposedly Scythian kurgans and one mound previously assigned to the Bronze Age. An additional 14 anomalies were recommended for excavation on the kurgans' periphery.[12] Archaeological excavations proved a satisfying conformity between the archaeological and geophysical reconstruction, and the actual distribution of features in the burial ground. Figure 6 shows the location of archaeological features studied in 2017/18 rendered as magnetic anomaly maps of three survey plots. The excavations revealed kurgans and other objects of three different periods, those of the Bronze Age, Scythian and Golden Horde.

Feature of the Bronze Age (beginning of the 3rd millennium BC)

Kurgan 52, as it was interpreted, had been constructed in the Bronze Age (Figure 6). Unfortunately, its mound had been almost completely destroyed by years of ploughing. Under the ring-shaped anomaly of 3.5 nT, a cut depression with a diameter 15–20 m, width of up to 3 m and depth of up to a metre was traced. It was followed by removing the overlying soil with a bulldozer and was easily visible owing to its dark grey fill. Nine burials of different periods were discovered under the mound, six belonging to the Pit-grave culture, two of the Catacomb culture and one of Scythian culture. The deepest two correspond to weak magnetic anomalies.

Features of the Scythian period (4th century BC)

All excavated features of this period are kurgans constructed from the second to the beginning of the last quarter of the 4th century BC. Scythian kurgans, as a rule, create clusters of anomalies owing to perturbations from burials, ring ditches and a crescentic cut depression, from where the soil had been taken in order to construct the mound. However, not every kurgan had all these elements: among the 24 Scythian kurgans studied, three had all these elements, one had no burial within the ring ditch, 13 had no ditches, and seven had no depressions (Figure 6).

Crescentic features were cut into the loamy subsoil to a depth of 0.2–0.8 m and filled with dark grey topsoil. They were excavated to the north of burials or ditches, and were indicated by anomalies of crescentic or oval shape with an intensity of up to 7 nT. The dimensions of the curving cut feature and the corresponding anomaly, as well as its distance from the centre of the kurgan, depended on the size of the kurgan. Ring ditches were the sources of ring-shaped anomalies with an intensity of 2.6-8 nT. The ditches were dug into the loamy subsoil to a depth of 0.3–1.2 m. Their fills, as well as the fills of the depressions, always resembled topsoil. Its magnetic susceptibility, measured by the field kappameter was $0.7\text{-}0.9*10^{-3}$ SI.

The Scythian burials at the Yekaterinovka burial ground were made in catacombs, and only rarely in a pit loculus. The vast majority of the graves had been looted in antiquity. The material of the filling of the looted and unlooted catacombs and their entrance pits is significantly different: the entrance pits of unlooted catacombs are usually filled with loose loamy subsoil material, sometimes mixed with stones from destroyed limestone overlay, whereas those the fill of the robber pits, which often ran through the entrance pit, contained more of a dark grey dense humus soil reflecting the fact that these pits had remained open afterwards. Unlooted catacombs are usually cavities and free of earth whereas looted ones contained mixed fills. Therefore, the magnetic anomaly maps often reflect the entrance pits of looted catacombs, as well as chambers that are largely filled with dark soil. Such objects create anomalies of the intensity 2-10 nT.

A typical example of the Scythian kurgan is No. 34 (Figures 5–6). The corresponding cluster of anomalies was found to consist of:

- a ring anomaly with a width of up to 1.5 m and a maximum intensity of 3.9 nT, and a diameter of 19 m;
- two anomalies from the funerary structures with a maximum intensity of 4.5 and 2.3 nT within the ring.

During excavation it became clear that this cluster of anomalies corresponded to a ploughed-out kurgan of the Scythian period with a mound now only surviving to a height of 0.60 m, a ring ditch and three catacombs. The first anomaly corresponded to a 19 m diameter ring ditch which was 0.9–1.0 m wide and a metre deep below the surface. Two other anomalies to the north and south corresponded with Scythian catacombs. The northern anomaly corresponded to burials 2 and 3. These were made in a large catacomb measuring 4.05 m in depth with two entrance pits located on opposite sides of the burial chamber, from the south and north respectively (Figure 7). The total length of the general funerary structure reached 7 m which is unusual for a kurgan of such modest size and the burial chamber contained two burials of different periods. The southern anomaly corresponded to intrusive burial 4. It was placed in the catacomb with the bottom between 1.80 and 2.40 m below the level of the ancient ground surface. The oval catacomb was large and measured

[12] Bondar, Daragan and Polin 2018.

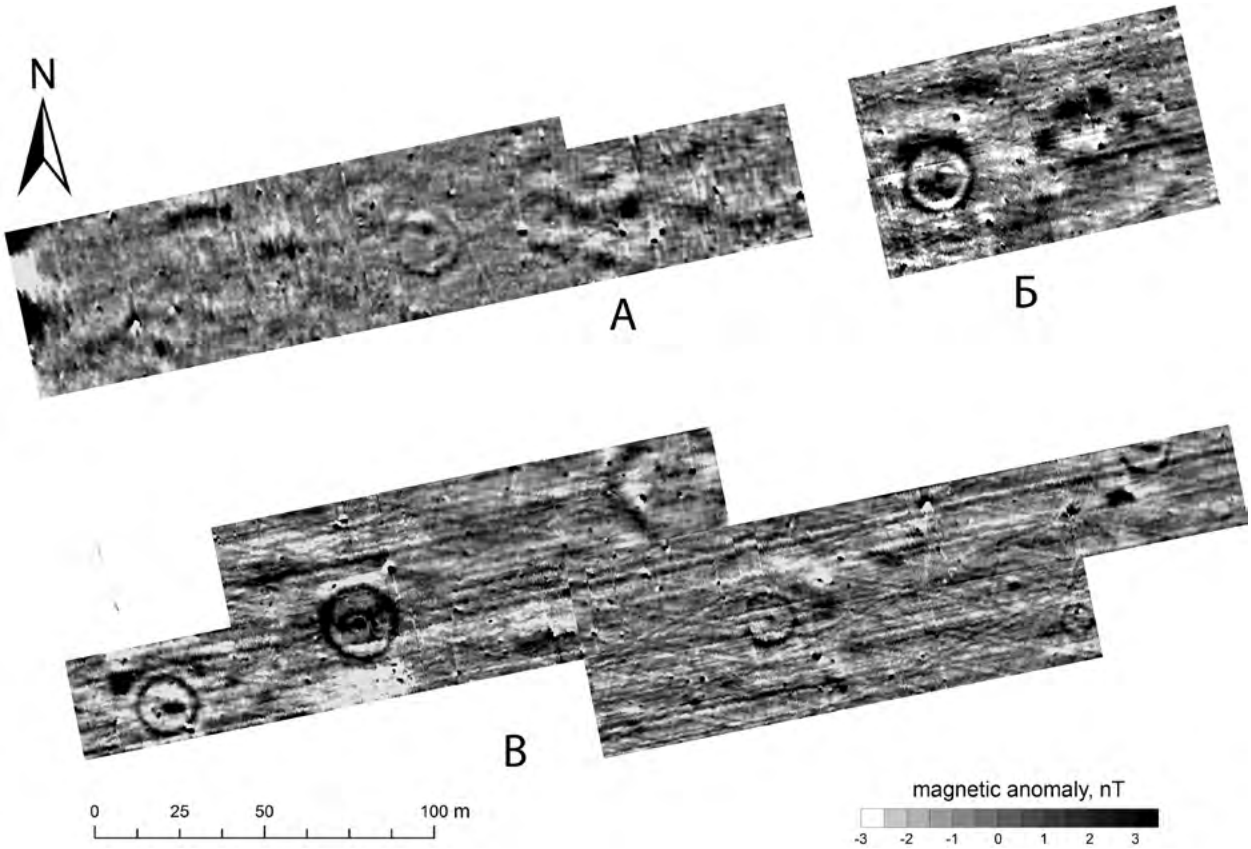

Figure 5. Yekaterinovka burial ground: magnetic anomaly maps of plots 1–3

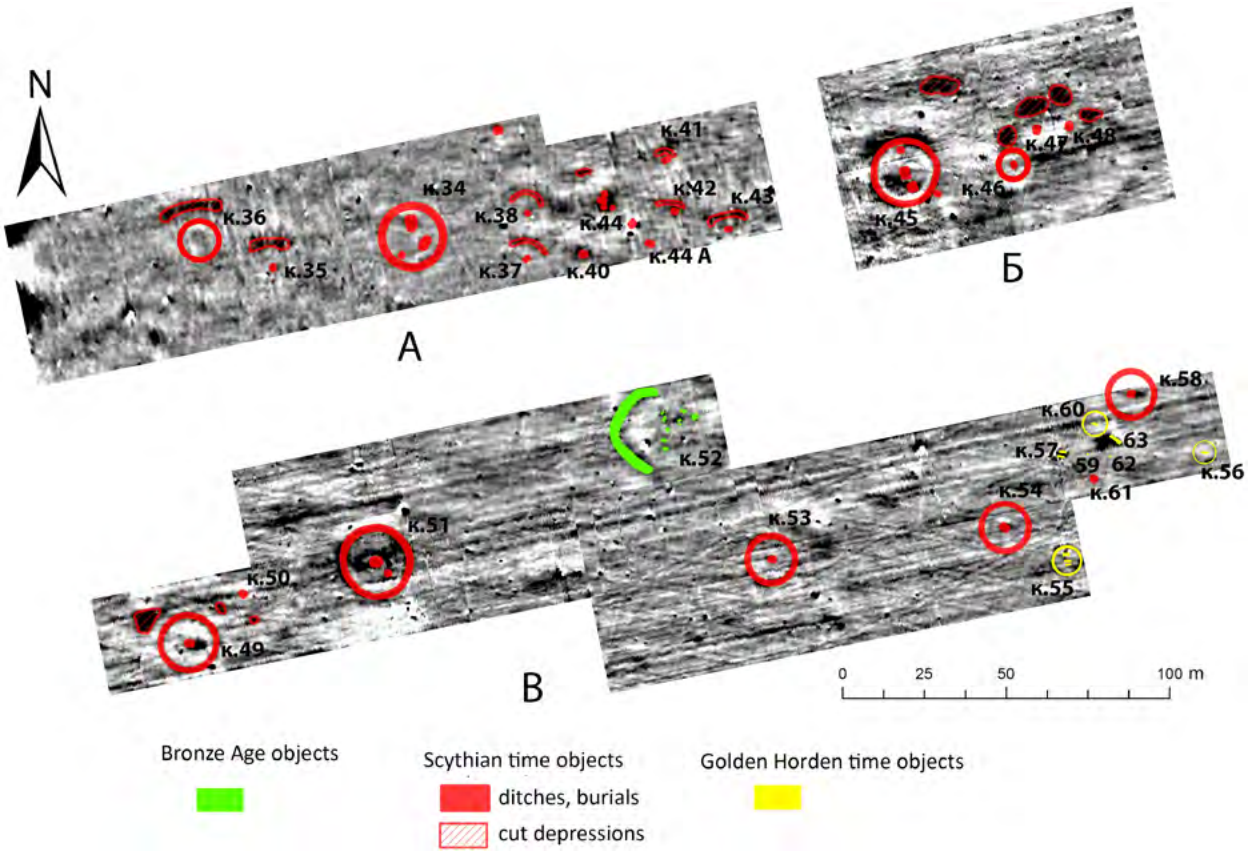

Figure 6. Yekaterinovka burial ground: maps of archaeological features excavated on geomagnetic survey plots 1–3

3.60 x 2.40 m. Another small catacomb, 2.22 m deep, did not create a sufficiently intense magnetic anomaly and therefore did not show on the magnetic map made before excavation.

Features of the Golden Horde period (13th–14th centuries)

The surprise was the opening of 4 kurgans and an oven of the Golden Horde period in the eastern part of section 3 of the burial ground (Figure 6). Ditches were discovered around three kurgans, two of which appeared on the magnetic map. The Golden Horde interments were made in pits with maximum dimensions of 2.5 x 0.8 m and a depth of 0.1–1.3 m from the level of the subsoil, and do not create measurable magnetic anomalies. The exception was a burial in kurgan 57, which was densely covered with fragments of burnt brick, iron quartzite and other stones, probably the remains of a mausoleum.

Thus, magnetometry revealed the presence of 29 kurgans in the area, where only 7 had previously been detected by satellite imagery and visual observations. It was proved as a result of complete archaeological excavations of all anomalies carried out in 2017/18. A total of 24 Scythian kurgans dating from the second to the beginning of the last quarter of the 4th century BC, a kurgan of the Bronze Age and four kurgans of the Golden Horde time (13th–14th centuries) were discovered. Anomalies from pits, catacombs, ditches and cut depressions had an intensity of 2-10 nT and were formed due to the difference in the magnetic susceptibility of the topsoil material infill of archeological features embedded into the loamy subsoil. For the first time the crescentic cut features near Scythian kurgans, from where the soil had been taken for kurgan construction, were revealed by geomagnetic survey and confirmed by archaeological excavations.

Results of study on the Novokhortitsa-1 kurgan

Visual survey, tacheometry and archaeomagnetic prospection was performed on the Novokhortitsa-1 kurgan where the pole top had been found previously (Figures 1–2). The height of this kurgan was only 0.40 m but it had a diameter of about 40 m. A dozen small unremarkable sherds of amphorae were found on the surface on the western side of the kurgan. Four additional fragments of a bronze pole top, as well as a fragment of a massive bronze bar, were found at a depth of 10–15 cm by using a metal detector: these had been disturbed by ploughing and were found about 25 m from the mound. Two newly discovered pole top fragments, together with the fragment previously found on this kurgan in the spring 2017, form one complete object, and two other new finds represent a second. All fragments, both old and new, have traces of plough damage which implies they were originally buried no more than 0.20 m from the surface, and most likely were among other remains of the funerary feast. The only thing which surprises us is the discovery of such objects at a kurgan of such small size, beneath which a rich burial is unlikely to be expected as in all other respects it is an ordinary kurgan and such a find is otherwise inexplicable. On the magnetic map, an anomaly is distinguished, presumably associated with the tomb (Figure 1). It has dimensions of 4.5 x 4.0 m; the maximum intensity is 20 nT.

When interpreting the result of a magnetic survey, local conditions should be taken into account. The kurgan is located in the vicinity of Krivoy Rog city, where the surface soil shows magnetic enhancement owing to industrial pollution. In addition, the soil cover is rapidly ploughed over which contributes to the ingress of anthropogenic magnetic minerals into the deep layers of the soil and causes additional perturbations of its magnetisation. These combined factors limit the search for small, shallow and weakly magnetised features in a given area, such as ring ditches or shallow burials, and therefore based on the magnetic map alone it is impossible to state unequivocally the absence of a ditch.

What is on the periphery?

The results of our studies at the Yekaterinovka cemetery and Novokhortitsa-1 kurgan confirm the saturation of near-kurgan space with valuable evidence of the past. There can be features of different scales, ranging from smaller kurgans to individual features on the edge of the kurgans. The extent of such activity on the periphery of Scythian kurgans in the northern Pontic region is still almost unknown and with great regret we have to admit that, even now, excavations of Scythian kurgans are often carried out only within the ring ditch and the ditch itself is seldom excavated. Moreover, the territory adjoining a kurgan which might contain cultural remains related both to its construction and to ritual actions carried out nearby, are not investigated and thus this information is lost to science, especially given the fact that investigated kurgans are removed from the state registration and their coordinates therefore lost. Different traces of kurgans are not always detectable on the surface but one cannot exclude their presence. It should also be noted that the ground with kurgans is usually fully ploughed and, to date, even the mounds of many kurgans have vanished and thus the question of their investigation does not even arise. Only visible kurgans with a preserved mound have become the subject of study.

The only objects previously known to us on the kurgan periphery are the remnants of funerary feasts which have often only been found accidentally in the vicinity of some kurgans. Our investigations on the Novokhortitsa-1 kurgan, and in particular the discovery

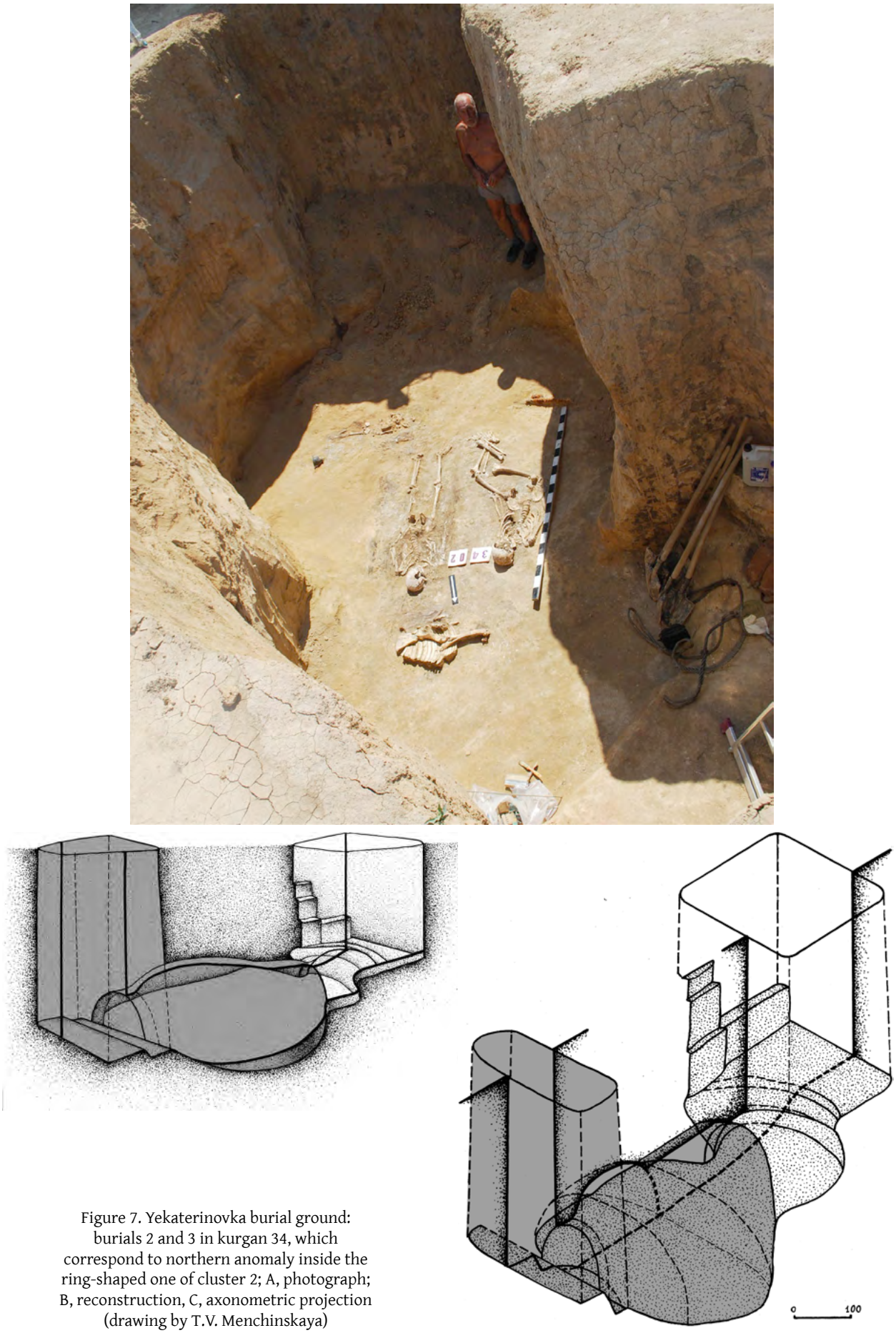

Figure 7. Yekaterinovka burial ground: burials 2 and 3 in kurgan 34, which correspond to northern anomaly inside the ring-shaped one of cluster 2; A, photograph; B, reconstruction, C, axonometric projection (drawing by T.V. Menchinskaya)

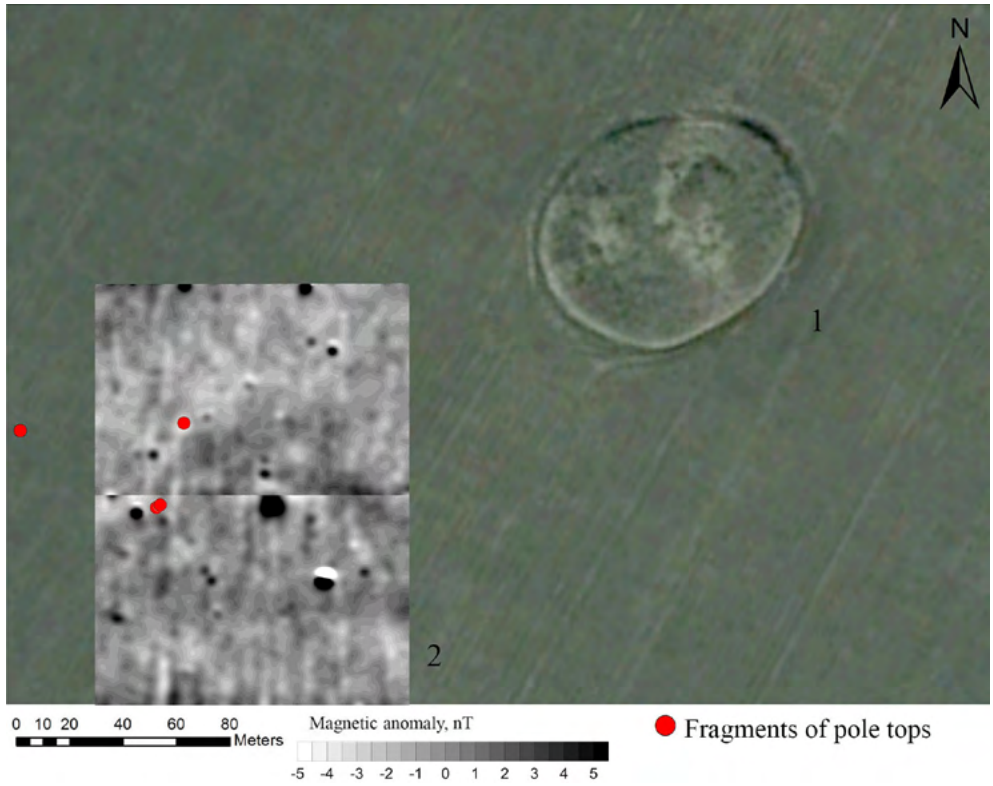

Figure 8. Novokhortitsa-1: A, composite satellite image and magnetic anomaly map of kurgan 1, Raskopanaya Mogila and kurgan 2, Novokhortitsa-1: B, digital terrain model of the Novokhortitsa-1 kurgan

of pole tops, unequivocally indicates the existence of feasting and a reconsideration of such finds from the northern Pontic region is in order. Indeed, the completion of construction of a kurgan was celebrated with general feast, the remains of which have been found at the vast majority of Scythian kurgans, both large and small. These remains were often found in the ring ditch on the western or, very rarely, the eastern side of the kurgan.[13] To some extent, these feasts can be considered an allusion of the feast near the kurgans of Scythian kings, performed one year after the funeral which is so vividly described by Herodotus.[14] For a long time, researchers almost did not pay attention to these feasts. The ring ditches were not excavated and only the presence of fragments of amphorae and animal bones was noted. In more recent years the situation has been rectified and B.N. Mozolevsky was especially consistent in this respect: following the excavation of Tolstaya Mogila kurgan, he was convinced of the high level of information offered by these feast remnants and he went on to excavate the ditches of all Scythian kurgans, regardless of their size.[15]

Nevertheless, as the available data now show, remains of feasting are not limited to the ditches. At the Vodyana Mogila kurgan (height 6.5 m) such remains were found in the ditch but also in the ploughed field to the northwest: there were fragments of no less than 32 amphorae and bones of more than 40 horses, cattle, sheep and red deer but unfortunately their spatial distribution was not studied, now were any investigations made outside the ditch. Here, among the amphora sherds wrecked by ploughing was a handle of the Phasos amphora which is key in dating the kurgan.[16] In the Babina Mogila kurgan (height 8 m), remains of feasts and associated memorial offerings were found in much larger quantities and belonged to several successive events associated with different burials, the most interesting and powerful assemblage being associated with tomb 2. Most of the finds were unearthed in the ditch, but some were found between the ditch and the last crepis in the western part of the kurgan, and also beyond the ditch to the west for a distance of up to 15 m where on the surface of the ploughed field there was a considerable number of small amphora sherds and animal bones. The remains of a near-kurgan curving feature, measuring more than 40 m long, was detected 4–5 m to the northwest of the ditch. Fragments of over 90 amphorae, black-gloss vessels, a set of funerary waggon ornaments, including more than 430 bronze plaques of various shapes, bronze bridle decoration and bones of more than 60 horses, cattle, sheep, dogs, red deer and wild boar were found representing the feast; a human humerus was also recovered. The surface distribution of feast remnants outside the ditch, as well as the near-kurgan ring feature, have not been investigated.[17] In the Soboleva Mogila kurgan (height 6 m), feasting remains were

[13] Mozolevsky and Polin eds 2005: 287–94.
[14] Herodotus, *The Histories* 4.72; quoted by Chugunov, this volume.
[15] Bibikova 1973: 67; Mozolevsky 1979: 167.
[16] Mozolevsky and Polin eds 2005: 79.
[17] Mozolevsky and Polin eds 2005: 94, 104–107, fig. 27.

found in a ditch on both sides of the western passage. Some amphorae sherds were laid to form a pavement above the accompanying burial 8. However, the remains of feasting at this site were very modest for a kurgan of this size: fragments of less than 30 amphorae and animal bones from no more than a dozen bulls, horses, sheep, dogs and wild boar were found. The question of the distribution of these finds beyond the ring ditch was not raised. At the Gaymanova Mogila kurgan (height 8 m), there was no ring ditch but, in addition to rich memorial offerings found under the base of the crepis, the remains of feasting extended across the field on the western side of the kurgan but were not studied. Near Zheltokamenskaya Tolstaya Mogila kurgan (height over 8 m), local residents state that large fragments of amphorae were found at a distance of 50 m to the west of the ring ditch during the planting of forest belts in the mid-1950s. Moreover, funeral feast remains outside the ditch or cromlech are also recorded for the Dvugorbaya Mogila kurgan (height 5 m), Sholokhovo kurgan 4 (height 4.3 m) and Vilna Ukraina-II kurgan 29 (height 2.3 m).[18] Close to the Ploskaya Mogila kurgan (height 5.30 m), more than 250 bronze plaques adorning a funerary wagon and its horses were found five years after the excavations of 1972, and located some 20–30 m to the northwest of kurgan. Fragments of at least 12 amphorae and bones of horses were found in the ring ditch on either side of a break on the western side which represents an original passage.[19] Finally, we should also mention Chmyreva Mogila (height 6 m), near where bronze pole tops had been ploughed up in the 19th century and two more collected nearby in the 1970s.[20]

At all of these kurgans, the places of the near-kurgan funeral feast have been destroyed by long-term ploughing and study of this evidence has been limited to the surface collection of finds arising from it. The unexpected advantage of investigating the near-kurgan funeral feast was only taken during additional study of the Scythian royal Alexandropol kurgan.[21]

Conclusions

New investigations on Scythian kurgans in the lower Dnieper area utilising magnetometry have revealed a considerable density of features in the burial grounds and periphery of individual kurgans. The kurgan burial ground of Yekaterinovka is an example of a complex archaeological site where Scythian funerary constructions with their unique distinctive features are located within the same area as kurgans of the Bronze Age and Golden Horde period. Based on the mapping of magnetic anomalies over an area of 3.65 hectares, 29 kurgans were identified. 24 Scythian kurgans, dating from the second to the beginning of the last quarter of the 4th century BC, were discovered as a result of archaeological excavations of anomalies carried out in 2017/18. The Novokhortitsa-1 kurgan is one of thousands of similar sites in the lower Dnieper Basin. It is heavily ploughed. The main burial tomb was located through magnetic prospection although the ring ditch was not identified. The discovery of Scythian pole tops unequivocally proves the existence of a near-kurgan funeral feast at this site. Special attention must be paid in future to search for evidence of such feasting as this was the principal activity occurring in the periphery of Scythian kurgans. Geophysical surveys should be made mandatory when planning and carrying out excavations on kurgans, especially in areas of intensive industrial and agricultural land use. The data obtained from this technique allow us to determine many new details important for the reconstruction of the funeral rite, as well as plan further steps in the study of archaeological sites.

Acknowledgements

We would like to thank Alexander von Humboldt Stiftung for the geodetic equipment provided to Dr M. Daragan.

[18] Olkhovsky 1991: 131.
[19] Boltric and Savovsky 1991: 98, 103, fig. 4.1–19.
[20] Brown 1906: 114, figs 70, 72; Boltric and Fialco 1996.
[21] Polin and Daragan 2011; Polin and Daragan, this volume.

The formation of the early Scythian cultural complex of the Kelermes cemetery in the Kuban region of the north Caucasus

Tatyana V. Ryabkova[1]

Abstract

This paper is devoted to an overview of groups of artefacts found in mounds in the Kelermes cemetery. A second exploration of Kelermes in the 1980s established the sequence of construction of the mounds, and this – together with changes in the collections of artefacts – makes it possible to trace the stages of the formation of the early Scythian cultural complex. The sequence of development can be traced on the basis of materials from the older Kelermes mounds, including mounds 1 and 2 excavated by Nikolay Veselovsky and mound 4 excavated by David Schultz. Intensive peaceful contacts with Transcaucasia, characteristic of a population which had migrated from central Asia at the time of Veselovsky's mounds, ceased abruptly in the period of Schultz's mound No. 4, which resembles a sort of return to the roots. Materials from mound 3 from Schultz's excavations demonstrate the extent of cultural interaction with the peoples of the Near East, Anatolia and the Caucasus. At that time, the fledgling nomadic culture was being enriched by the achievements of the eastern Greek world. The 'royal' class of artefacts from this complex show the unusually high social status of the deceased which was comparable with that of Assyrian kings. There are numerous analogies between the materials from mound 24 with finds from other mounds of the ancient Scythian period, making it possible to synchronise it with these monuments. Mound 24 is one of the latest in the cemetery and appeared at a time when there was not yet any Greek pottery in the Kuban region, despite the fact that links with the eastern Greek world already existed. Finds from the 1st Razmenny (Kostromsky) mound and the settlement of Tarasova Balka are evidence for the large-scale import of ancient pottery into the Kuban region in the last quarter of the 7th century BC. The changes observed in the inventories from the Kelermes cemetery show the length of time the cemetery was in use, the incorrectness of applying dates of monuments with ancient pottery to all its mounds, and the impossibility of dating the cemetery to a narrow time-frame.

Keywords: Ancient Scythian period; north Caucasus; Kuban region; Kelermes cemetery; Veselovsky mounds; Schultz mounds; archaeological culture; complex; chronology

Introduction

Despite the fact that the number of sources relating to early Scythian archaeology has increased significantly in recent years, the materials from the Kelermes cemetery continue to be of vital importance in the study of the early stages of Scythian history, as it is they which document the appearance of a new culture in Ciscaucasia. Their exceptional richness and diversity and, most importantly, the inclusion among them of artefacts of ancient Near Eastern manufacture are still determining factors in obtaining key dates for tombs in various regions across the Scythian world.[2]

The existence of the Kelermes cemetery in the Kuban region became known in 1904, when unique finds from its burials arrived in St. Petersburg and caused a genuine sensation. The excavations had been carried out by a mining technician by the name of David Schultz. Realizing the site's importance, the Imperial Archaeological Commission entrusted him to carry out further excavations, despite his lack of any special education. Schultz excavated the richest mounds in the cemetery but failed to devote necessary attention to the documentation of his explorations, and his reports are full of inaccuracies. It also soon became clear that he had appropriated and sold some of the artefacts he had found. His permission was withdrawn and the further exploration of Kelermes was entrusted to Nikolay Veselovsky, a senior member of the Imperial Archaeological Commission and a professor at St. Petersburg University. In 1904 he explored two Scythian mounds in the cemetery: as a professional he paid attention not only to the valuable artefacts but also to the ordinary objects, the pottery, items of harness and arrowheads. Nevertheless, he was acting in accordance with the requirements and methods of his time which makes it difficult to work with his field reports. The materials were transferred to the Hermitage, and from the moment of their publication in the early 20th century, Kelermes acquired the status of a type site.[3]

Taking into account the importance of the Kelermes mounds on the one hand, and the problem of recording

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[2] Maslov 2012: 342–43; Alekseev and Ryabkova 2013: 13.

[3] Imperial Archaeological Commission 1907: 86–95.

the exploration process on the other, it was decided to undertake a further exploration of the cemetery. In 1980 the State Hermitage Museum organised an archaeological expedition to Kelermes (1980–1995), led initially by Lyudmila Galanina and later by Andrey Alekseev. Galanina subsequently published materials from the Kelermes mounds, combining data from the excavations at the beginning of the century and the contemporary ones.[4] In Alekseev's works the materials from Kelermes enabled a new interpretation.[5]

Ever since the Kelermes materials were fully published, discussions on when the cemetery originated and how long it functioned have never ceased. Several approaches have taken shape to the resolution of this matter. Adherents of the first of these believe that the cemetery was constructed in stages, and that there was a substantial chronological gap between the older mounds excavated by Nikolay Veselovsky (hereafter 'V mounds') and the later mounds excavated by David Schultz ('Sch. mounds'), supported by the different categories of artefacts.[6] The older mounds were constructed before Scythian campaigns in the Near East and should be dated before the 670s BC, possibly even to the 8th century BC, while the later mounds post-date the campaigns and should be dated to the middle or late 7th century BC.[7] Advocates of the second approach insist that the materials from the Kelermes mounds form a single spectrum of antiquities and fit within a narrow time-frame, the upper limit of which is defined by the dating of Ionian vessels from mound 16 in the Novozavedennoye-II cemetery, 'which has numerous correlations to Schultz's mounds'.[8] According to this hypothesis the whole Kelermes period dates from the second quarter or middle of the 7th century BC to 610–590 BC.[9] There is a third point of view concerning the synchronicity of the materials from Kelermes and those from both tombs in the Ryapyakhovataya cemetery in the Dnieper region, which enables all the sites to be dated to the first quarter of the 6th century BC.[10] However, those in favour of dating all the mounds in the Kelermes cemetery to the same time as the burials with Greek pottery from mound 16 of the Novozavedennoye-II cemetery, the Ryapyakhovataya cemetery and Temir-Gora ignore the fact that not a single fragment of ancient pottery has been found at Kelermes.

One of the arguments in favour of the phased construction of the cemetery is its topography. New data was obtained during the second archaeological exploration which showed that the mounds from the

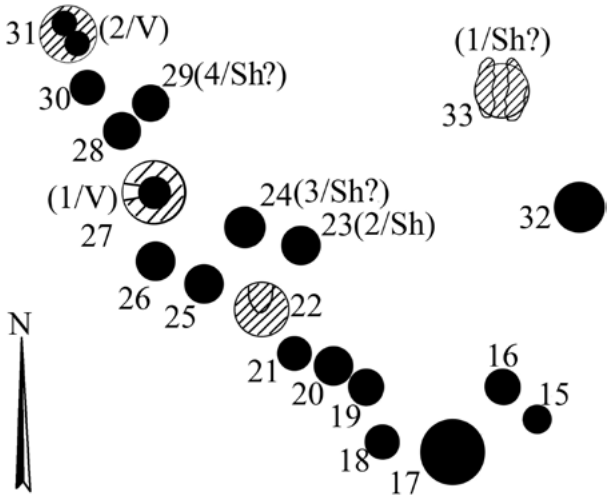

Figure 1. The northern part of the Kelermes cemetery with two parallel chains of mounds: mounds 27 (1 V), 28, 30, 31 form the western chain; mounds 15, 16, 23 (2 Sch.), 24 (3 Sch.?), 29 (4 Sch.?) represent the eastern chain (after Alekseev and Ryabkova 2013: fig. 2)

Scythian period are concentrated in the northern part of the cemetery. Mound 2 V was built on the site of two Bronze Age mounds,[11] and mound 1 V was incorporated into a chain of Bronze Age mounds, while mounds 23, 24 and 29 (probably comparable with Schultz's mounds 2–4) constituted a separate and independent group of mounds built to the side of the principal mound (Figure 1). It is likely, therefore, that the mounds of the older and later groups were constructed according to different building traditions and may relate to different periods. Other evidence of the interval in time between the construction of the older and later mounds is provided by radiocarbon dating,[12] and the fact that most of the artefacts made in the ancient Near Eastern tradition principally come from Schultz's mounds. The probable sequence of the construction of the mounds was as follows: mound 31 (2V) – 27 (1V) – 29 (4 Sch.?) – 24 (3 Sch.?) – 23 (2 Sch.).[13] However, it is still unclear where mound 1 Sch. was located.

In addition to the existence of the basic characteristics of funerary ritual similar to the ancient stereotype of a Scythian king's tomb as described by Herodotus,[14] the data on the range of finds from each mound make it possible to trace the development of the material culture of the people who built these monuments, as well as changes in the political situation in the region. The materials from the Kelermes mounds demonstrate both the appearance of innovative categories of artefacts, and their transformation over time as a result of the interaction with neighbouring peoples, changes

[4] Galanina 1997.
[5] Alekseev 2003*a*.
[6] Medvedskaya 1992; Galanina 1997: 178; Alekseev 2003*a*: 104–107; Alekseev and Ryabkova 2013.
[7] Alekseev 2008: 9.
[8] Maslov 2012: 350.
[9] Erlikh, Kantorovich and Maslov 2015: 74–75.
[10] Kuznetsova 2016: 126, 130.
[11] Alekseev and Kuznetsova 2001: 84.
[12] Alekseev *et al.* 2005: 146–48.
[13] Alekseev and Ryabkova 2013: 16.
[14] Herodotus, *The Histories* 4.71, quoted by Barfield, this volume; cf. Galanina 1997: 80.

in the political situation and the Scythian campaigns in the Near East.

One of the most outstanding innovations of Kelermes, originating in eastern Eurasia, was the mass burial of saddle-horses, which were placed in rows along the western and southern sides of the grave pits. The tradition of large-scale horse burials, first recorded in the Arzhan royal burial-mound in Tuva, subsequently became widespread in later Scythian monuments. Taking into consideration the differences in the horse equipment from the Arzhan mound, Mikhail Gryaznov posited that the horses were funerary gifts to the king from different tribal subjects.[15] This probably also explains the diversity of the sets of harness at Kelermes.[16] The presence of items of material culture belonging to neighbouring tribes in the earliest Kelermes mound (2 V) suggests that the nomads not only brought to the west elements of their material and religious culture, but also their own traditions, in accordance with which warlike neighbours could take part in the royal funeral rituals.

Mound 2 V

Artefacts whose origins are linked with central Asia are most extensively represented in the materials of the oldest Kelermes mound (2 V). In particular, the bridles of 12 of the 16 sacrificed horses found in this mound are decorated in Scythian 'Animal Style' and whose principal motifs hark back to central Asian prototypes.[17] Only zoomorphic bone finials in the shape of the heads of a sheep-bird, or a sheep or horse's hoof have survived from the wooden composite cheekpieces found only in the older Kelermes mounds.[18] Composite cheekpieces were first recorded in the Arzhan royal burial-mound in Tuva.[19] Artefacts which are typologically similar, but different in style, are sometimes encountered in nomadic monuments of a later date, namely burial 1 in the Ryapyakhovataya cemetery, and mounds 13–14 at Novozavedennoye-II. Composite cheekpieces probably only existed in the early stages of the development of Scythian culture and were subsequently replaced by pieces carved entirely from bone.

Another artefact of probable Far Eastern origin is a disc-shaped mirror with a border and the depiction of a curled feline predator on the handle.[20] Both the helmets from mound 2 V, like that from mound 1 Sch., are of the 'Kuban' type.[21] Some researchers believe that helmets of this type originated in China as they are encountered in cemeteries of the Western Zhou dynasty from the 11th century BC onwards.[22] Another object category of Chinese origin are spherical openwork terminals. Five of these from mound 2 V form a compact group which are identical in shape, copper composition and the use of rhomboid motifs in the upper part (Figure 2.4). An analysis of a substantial number of artefacts with these symbols has shown that rhomboid motifs had a symbolic meaning and probably date back to the Okunev tradition.[23] The importance of these symbols is shown by the fact that they also feature on terminals of similar shape from mounds 3 Sch. and 4 Sch. (Figure 2.6–7a). However, whereas the symbols on the terminals from barrow 2 V were applied at the stage of creation of the wax model, those found in the Schulz mounds were engraved on the terminals after casting. The closest analogies to the terminals from mound 2 V come from monuments of the Western Zhou dynasty (1100–771 BC) in the Chinese province of Shaanxi (Figure 2.1); a similar terminal deriving from excavations in the north of Shaanxi Province is in the Arthur M. Sackler collection (Figure 2.2). The main difference between these terminals and those from Kelermes is that they are of smaller dimensions, which is fully compatible with the dimensions of a terminal from the Korsukovsky hoard (Figure 2.3), dated between the Chinese and Kuban region examples. It is probable that Western Zhou terminals instigated the evolution of terminals of that type, both in China and the Kuban region.[24]

The special importance of the southwest part of the cemetery was emphasised by the presence of horses with gold bridle adornments buried in both the older mounds excavated by Nikolay Veselovsky. There was a sumptuous bridle on horse 6, the westernmost horse in the southern row in mound 2 V (Figure 3.1). It is characteristic that the large facings of bridle plaques made of gold leaf, decorated with a multi-tier ornament in the form of concentric circles of 'running spirals' with a rhomboid motif in the centre, have not yet been found anywhere except in the older mounds at Kelermes. A similar ornament with a single-tier composition was used to decorate the covering of gold foil from mound 20 of the Nartan cemetery (Figure 3.7). Interestingly, the 'running spiral' ornament was frequently used to decorate artefacts of the Cretan-Mycenaean world.[25] Circular adornments of gold foil with similar decoration are known in materials from the Mycenaean tombs of Circle A, which date from 1550–1500 BC (Figure 3.4) and probably existed in this region throughout the Geometric period judging by analogies from the Prinias cemetery in Crete which dates to the 9th–8th centuries BC. This ornamentation may have come into the repertoire of early Scythian

[15] Gryaznov 1980: 50.
[16] Kovalev 1987: 29; Galanina and Alekseev 1990: 53; Galanina 1997: 70, 82.
[17] Alekseev 2003*a*: 55.
[18] Galanina 1997: pls 22, 270–71, 290–92.
[19] Gryaznov 1980: 26; Smirnov 2005: 91.
[20] Alekseev 2003*a*: 47.
[21] Galanina 1985.
[22] Alekseev 2003*a*: 46–48; Wu 2013: 91–92.
[23] Ryabkova 2016: 218.
[24] Ryabkova 2016: 217–18.
[25] Higgins 1974: figs 52–54, 99.

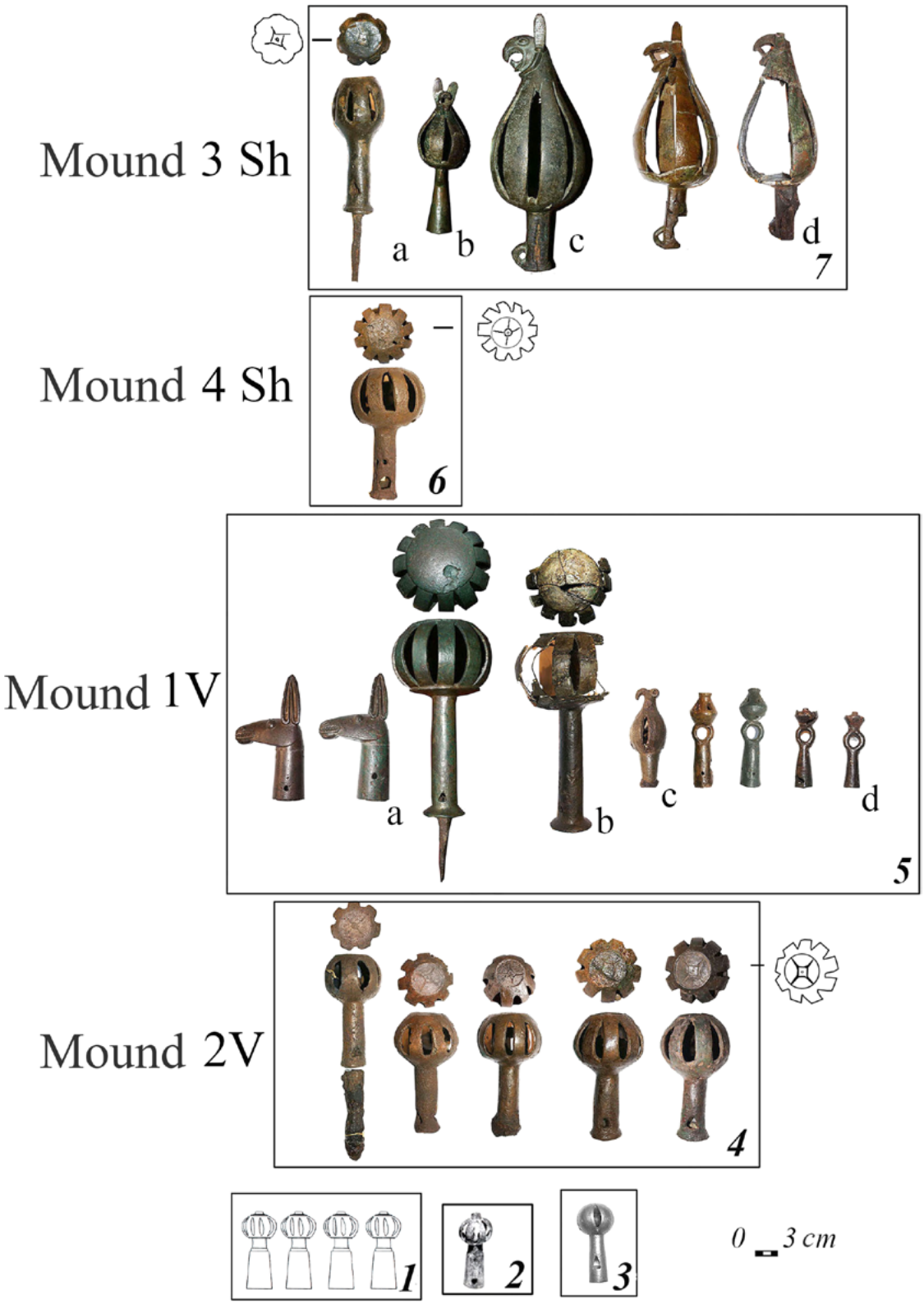

Figure 2. Kelermes terminals with ball-shaped openwork bells and their prototypes: 1, bronze terminals, H 10.2 cm, Tomb 1, Western Zhou cemetery, Shigushan, Baoji, China (after Shaanxi Sheng Kaogu Yanjiuyuan, Baoji Shi Wenwu Luyouju 2014: 71, cat. 9); 2, bronze terminal, H 9.1 cm, Arthur M. Sackler Collection, northwest China (after Bunker *et al.* 1997: 130, no. 16); 3, bronze terminal, H 10.5 cm, Korsukovsky hoard (after Zuev and Ismagilov 1995: fig. 2.3); 4. copper terminals, H 14.8–17 cm, Kelermes, mound 2 V (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/201, 203, 204, 117, 118); 5, bronze terminals, H 16.8, 17, 34.8, 25.5, 13.5, 10–13.2 cm, Kelermes, mound 1V (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/108, 110, 202, 205, 123, 119–122); 6. Bronze terminal, H 17 cm, Kelermes, mound 4 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1903-1904-1/41); 7, bronze terminals, H 31, 35, 30, 30, 27.5 cm, Kelermes, mound 3 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1903-1904-1/42, 44)

culture through the cultures of the Caucasus, where a multi-row ornament in the form of a 'running spiral' is known on bronze belts, mostly dating to the 8th century BC.[26] In the region of the Koban culture in the central Caucasus, a similar ornament is known from the Proto-Koban period (13th to first half of the 12th century BC) (Figure 3.6) and, in the opinion of Valentina Kozenkova, is reminiscent of Mycenaean ornamentation.[27] The 'running spiral' motif in the Chernoless culture and in the culture of pre-Scythian nomadic tribes in the Dnieper region (Figure 3.5) is also probably the result of contacts with the Caucasus which had existed since the Chernoless period.[28]

The bridle sets of horses 15 and 16 included plaques in the shape of four-petal rosettes (Figure 3.8), which are similar to materials from pre-Scythian cemeteries in the Kuban region (Figure 3.9–10). These are the horses which can probably be considered to be evidence for the participation of neighbouring non-Scythian tribes in the ritual of royal funerals.

Evidence of well-established contacts with Transcaucasia is provided by fragments of a bronze riveted situla and a large bronze vessel with cast handles. The bronze riveted situla with cast handles in the form of the head of an animal with exaggerated ears[29] relates to a type of artefact which is widespread at pre-Scythian and early Scythian monuments, and concentrated in the central and northwest regions of the Koban culture.[30] The fragmentary nature of the second bronze vessel makes it impossible to restore its shape and dimensions accurately,[31] yet its probable manufacture in the Caucasus can be judged by the similar fixing of handles on smaller single-handled vessels from mound 20 of the Nartan cemetery.[32]

Mound 1 V

The materials from the second-oldest mound (1 V) are significantly more imposing in appearance: despite the fact that the mound had been robbed in ancient times, it contained numerous items which demonstrated the strengthening power and influence of the Scythian union and the explosive development of its culture, probably caused by active interaction with the peoples of the Transcaucasus and the Near East. A small cauldron with smooth handles on the sides differs from other Kelermes cauldrons, not only in outward appearance but also in technological terms. Its manufacture is evidence for the use of a tradition which was atypical of bronze casting in eastern Europe as it was cast from a lost-wax model with the use of a wide sprue inserted into the cavity of the mould, rather than the side as in other cauldrons.[33]

As in mound 2 V this burial was accompanied by the sacrifice of horses: along with 10 unbridled horses, there were four with bridles decorated with gold facings with a multi-tiered ornament in the form of a 'running spiral' (Figures 3.2–2a, 3). The bridle adornments of three horses were decorated with designs in 'Animal Style'. The bridle sets of horses 11 and 12 included plaques made using the cloisonné incrustation technique (Figure 3.11). The distinctive feature of the cloisonné technique is the adhesion of stone inlays into sockets of thin metal strips welded to the base.[34] This technique, which was widespread in the Near East, had been commonly used in the northeast Transcaucasus since the 14th century BC and the compositional plan harks back to the décor of artefacts from Transcaucasus,[35] so the plaques were clearly imported from that region.

Of the 15 terminals found in the burial (Figure 2.5) three were made in Scythian 'Animal Style' and take the shape of heads of mules and the head of a bird of prey, although the latter relate in style to an earlier group of depictions (Figures 2.5c, 4.1). The conveying of the eye by a relief circle with an aperture in the middle protruding beyond the contour of the head is a method which is more typical of the ancient Arzhan-Mayemir stage of 'Animal Style' and features on the earliest petroglyphs and a 'deer' stone from Arzhan-1. The proliferation of images of birds of prey in the Kuban throughout the pre-Scythian and early Scythian periods is confirmed by their use in the decoration of a three-hole bone cheekpiece in the Hermitage collection which was made in imitation of three-loop cheekpieces of the Uashhitu type (Figure 4.2).[36]

Along with terminals of a typically nomadic appearance with depictions of animals, the complex also includes massive artefacts reproducing the shape of terminals with small spherical bells from mound 2 V (Figure 2.5b) and terminals with biconical openwork bells (Figures 2.5d, 4.3), which reproduce in a simplified form the shape of objects with revolving figures on so-called anchor-shaped shafts which were widespread in the Transcaucasus from the 17th to 13th centuries BC (Figure 4.7). The upper part of these Transcaucasian artefacts were decorated with various figures on tall bases on which the figure could revolve on its own axis.[37] The similarity of the Kelermes examples to these can probably be explained by close contacts with Transcaucasus and whose technical and cultural

[26] Rayevsky and Pogrebova 1997: 87.
[27] Kozenkova 2013: 75.
[28] Terenozhkin 1961: 201.
[29] Galanina 1997: pl. 40, 227.
[30] Kozenkova 2004: 96.
[31] Galanina 1997: pl. 40: 226, 228.
[32] Batchayev, Bartseva and Kerefov 1985: pls 48, 38, 39.
[33] Galanina 1997: 152; Minasyan 1986: 66–68.
[34] Minasyan and Shablavina 2009: 257.
[35] Galanina 1983: 45; Ryabkova 2014*a*: 164.
[36] Ryabkova 2014*c*: 211–13.
[37] Danilicheva ed. 2016: 62.

Figure 3. Kelermes, mounds 1 and 2 V. Bridle decorations and analogies: 1, gold facings of bridle plaques, L 13.5 cm, Kelermes, mound 2V, horse 6 (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/156,157); 2, 2a, gold facings of bridle plaques, D 13.5, 14.1 cm, Kelermes, mound 1V, horse 13 (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/8, 9, 50); 3, gold facings of bridle plaques, D 13.7 cm, Kelermes, mound 1V, horse 14 (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/23–25); 4, gold roundel, D 10.2 cm, Mycenae, Shaft-Grave V (National Museum, Athens inv. nr. 640 = author's tracing); 5, bone bridle decoration, L 8.5 cm, Zolny mound (after Terenozhkin 1976: fig. 17.6); 6, bronze belt buckle, L 6.8 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 1360/64); 7, gold foil plaque, D 5.1 cm, Nartan, mound 20 (after Batchayev, Bartseva and Kerefov 1985: pl. 48.54); 8, bronze bridle decoration, L 4.4 cm, Kelermes, mound 2V, horse 16 (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/196); 9, bronze bridle decoration, D 7 cm, Chishkho, burial 1 (after Erlikh 2007: fig. 198.13); 10, bone plaque, L 6 cm, Kubansky, Grave 50 (after Erlikh 2007: fig. 198.14); 11, bronze bridle decoration with silver and stone, D 4.3 cm, Kelermes, mound 1V, horse 11 (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/95)

traditions played a significant influence on the fledgling nomadic culture. It is important to note that the terminals also differ in their metal composition as Scythian terminals were typically made of bronze with a lower tin content.

A fragmented bone object – a stamp-seal with six rows of square teeth on a base (Figure 4.5) – can be seen as further proof of close contacts with the Transcaucasus. According to Lyudmila Galanina, there are no such objects in Scythian monuments in the Black Sea

Figure 4. Kelermes, mound 1 V. Artefacts from the complex and parallels: 1, bronze terminal, H 13.5 cm, Kelermes, mound 1V (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/123); 2, bone cheekpiece, L 6.6 cm. Kuban (?), chance find (The State Hermitage Museum, St. Petersburg, inv. nr. 2534/42); 3, bronze terminal, H 13.2 cm, Kelermes, mound 1V (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/120); 4, bone stamp-seal, H 4 cm, Kelermes, mound 1V (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/107); 5, fired clay stamp, H 3 cm, Serzhen–Yurt settlement (after Kozenkova 1982: pl. XLI.16); 6, fired clay stamp, H 4.3 cm, Alkhastinskoe settlement (after Kozenkova 1982: pl. XLI.18); 7, bronze terminal on an anchor–shaped base, H 19 cm, Noyemberyan History Museum of Armenia, inv. nr. 2908-1 (after anon. 2016: cat. 31); 8. Stone stamp, H 7 cm, Dvin (after Kushnareva 1977: fig. 17.1)

Figure 5. Kelermes, mound 1 V. Decorations and analogies: 1, glass beads, D 1.3–1.6 cm, Kelermes, mound 1V (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/99); 2, gold beads, L 0.3–0.5 cm, Kelermes, mound 1V (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/3); 3, necklace of gold beads with eye stones, Nimrud, Tomb II, sarcophagus (after Hussein, Altaweel and Gibson 2016: pl. 50)

region.[38] There are no precise parallels for this piece, yet stone and fired clay seal-stamps were widespread in Transcaucasus and have been found at Dvin and settlements of the Koban culture[39] (Figures 4.5–6, 8). A stone stamp-seal with its upper part in the shape of the head of a bird of prey is among the finds from Ziwiyeh in western Iran.[40]

Along with opaque vitreous paste beads, the range of adornments included glass beads, each made by winding three strips of different coloured glass (yellow, light blue and dark blue) around a core of blue glass (Figure 5.1). The question of the provenance of these beads requires special research, but they were evidently made in a specialised workshop.[41] Of the gold adornments three patches for sewing on to clothing have survived, as well as the remains of a gold ornament with tubular beads for stringing with thin wire welded to both ends (Figure 5.2). Substantially similar to these strings are the details of a gold necklace from the second queen's tomb at Nimrud (Figure 5.3), where the sarcophagus of queen Yaba, wife of Tiglath-pileser III (745–727 BC), was found. According to Iraqi archaeologists two burials were found in the sarcophagus: the lower one may be that of queen Yaba, but the attribution of the upper one is complicated by the fact that the artefacts bear the names of queen Baniti, wife of Shalmaneser V (727–722

[38] Galanina 1997: 162.
[39] Kushnareva 1977: 34; Kozenkova 1982: 66–67.
[40] Godard 1950: 56, fig. 47.

[41] I am grateful to Olga Anikeyeva for her consultation on this matter.

BC) and queen Atalya, wife of Sargon II (722–705 BC).[42] In any case, the items from the sarcophagus date between 745 and 705 BC, hence the upper chronological limit for the necklace is the late 8th century BC. The details of the ornaments from Kelermes probably can be dated to a similar time-frame. It is not entirely clear how parts of the necklace came to be at Kelermes but it is likely that such a piece arrived in the Kuban region as the result of a trading or diplomatic exchange.

Mound 29 (4 Sch. ?)

Mound 29, studied by the Hermitage expedition to Kelermes, was one of a chain of mounds situated to the northeast of the main chain which included Nikolay Veselovsky's mounds (Figure 1). Its conjectural correlation to mound 4 Sch. is based on the existence of an excavation trench and the remains of seven sacrificial horses, and is highly hypothetical. Lyudmila Galanina observed that it could be one of the mounds partly uncovered by David Schultz, which he briefly mentions in his later reports.[43] Despite the fact that the tradition of horse sacrifices had survived, the inventory of the burial found at the level of the ancient ground-surface appears modest in comparison with the inventories from Veselovsky's mounds. Among the artefacts found were fragments of pottery, some iron and bronze bridle accessories, and an iron arrowhead. The objects not typical of Veselovsky's mounds were fragments of scale armour, a piece of amber and a fragment of a stone dish.[44]

Stone dishes are a specific and expressive element of early Scythian culture but are comparatively rarely found in burials. Unfortunately, the Kelermes dish is represented only by a small fragment and it is impossible to determine its size. However, the broad border and thick bottom suggests that it was a massive object which can be compared with large dishes from mound 1 of the Lyubotinsky cemetery,[45] and the burial near Konstantinovsk-on-Don.[46] Both of these burials relate to the early stage of Scythian culture, thus may confirm Lyudmila Galanina's suggestion that mound 29 has a similar date as the older mounds at Kelermes.[47]

Mound 4 Sch.

Mound 4 excavated by David Schultz differs substantially from Nikolay Veselovsky's mounds, although the main signs of the funeral ritual appear to have been preserved. There are traces of horse sacrifices but on a somewhat smaller scale. Of the seven horses mentioned by Schultz only one had a bridle with gold ornaments (Figures 6.1–3). To all appearances the positioning of the bridle decoration and their dimensions are similar, but the décor consists exclusively of motifs belonging to the Scythian-Siberian 'Animal Style' with analogies in eastern Eurasia: for example, the figure of a deer (Figure 6.1) is very similar to that on depictions on plaques from mound 5 of the Chilikty cemetery (Figure 6.5), and the depiction of a horse is similar to those on 'deer' stones of the Mongol-Transbaikal type.[48] Interestingly, there is only one terminal with a spherical openwork bell (Figure 2.6) which reproduces details of the terminals from mound 2 V, but the rhomboid motif was engraved after casting. The terminal is also somewhat larger and differs from the others in its metal composition.[49] The new features of the funerary ritual include the use of iron spears stuck into the ground by the south wall of the tomb,[50] and the placing in the tomb of a wooden vessel, whose gold overlays have survived (Figure 6.4). Vessels with gold overlays, which had a ritual purpose, were widely used in nomadic Scythian culture and are one of its generally accepted indicators.[51]

Another marker of Scythian culture are large bronze cauldrons with handles in the shape of animals which project upwards from the rim, and one of these was found in this mound.[52] All the cauldrons were cast according to models that have been lost using several processes; the handles were made separately and were subsequently cast onto the rim and additionally secured by forging.[53] It is thought that these cauldrons provided the initial shape for classic Scythian cauldrons.[54]

Bronze and bone arrowheads were found by the north wall of the tomb. Unfortunately, it is impossible to assign the quiver sets from Schultz's mounds to any particular mound, but a substantial number of the arrowheads summarily ascribed to his mounds 2–4[55] are two-bladed with a symmetrical rhombic head (Figure 6.6). Analogies to these are frequently found at central Asian tombs,[56] and it is therefore likely that the presence of these arrowheads shows the existence of a central Asian component in the Kuban region at the time Schultz's mounds were constructed.

We can therefore trace a line of development based on materials from the older mounds at Kelermes, which include Veselovsky's mounds 1 and 2 and possibly Schultz's mound 4: the intensive contacts with Transcaucasus typical of the time of Veselovsky's

[42] Hussein, Altaweel and Gibson 2016: 13–14.
[43] Galanina 1997: 52.
[44] Galanina 1997: pls 12, 394-396; 24, 397-403; 34, 404-406; 41, 412.
[45] Bandurovsky, Buynov and Degtyar 1998: fig. 3.5.
[46] Kiyashko and Korenyako 1976: fig. 2.4.
[47] Galanina 1997: 184.
[48] Grach 1980: fig. 54; Kisel 2003: 42–43.
[49] Ryabkova 2016: 219.
[50] Galanina 1997: pl. 12.49.
[51] Alekseev *et al.* 2017: 278.
[52] Galanina 1997: pl. 41.53.
[53] Minasyan 1986: 66; pers. comm.
[54] Galanina 1997: 152.
[55] Galanina 1997: 104, 231.
[56] Galanina 1997: 110; Ryabkova 2014*b*: 246.

Figure 6. Kelermes, mound 4 Sch. Artefacts from the complex and analogies: 1, gold facing of a bridle plaque, D 12.8 cm, Kelermes, mound 4 Sch (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1904-1/15,16); 2, fragmentary gold facing of a bridle plaque, L 8.4 cm, Kelermes, mound 4 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1904-1/19); 3, gold facing of a bridle plaque, D 6.2 cm, Kelermes, mound 4 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1904-1/17); 4, gold facings of a wooden vessel, L 1.2–2.7 cm, Kelermes, mound 4 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1904-1/24); 5, gold plaque with turquoise, H 4.6 cm, Chilikty, burial mound 5 (The State Hermitage Museum, St. Petersburg, inv. nr. 2326/1); 6, bronze arrowheads, L 3.1–4.3 cm, Kelermes, mounds 2–4 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1903-1904-1/19, 32); 7, silver mirror, D 17 cm, Kelermes, mound 4 Sch. (?) (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1904-1/27); 8, gold plate from casing of a *gorytos*, L 40.5, W 22.2 cm, Kelermes, mound 4 Sch. (?) (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1904-1/28)

mounds had abruptly ceased by the time mound 4 Sch. was constructed.

Only two items in this mound were clearly imported: a famous electrum mirror and a plate from the case of a *gorytos* (Figures 6.7–8). However, their connection with this mound is doubtful, as Schultz himself related them to mound 3.[57] Even if we assume that these valuable artefacts come from mound 4 Sch., their design shows that they were specially made for the nomads, taking their preferences into account.

Mound 3 Sch.

Mound 3 excavated by David Schultz contained the burial of a man accompanied by a large quantity of precious objects, 21 sacrificial horses, bronze terminals, a cauldron and vessels of bronze and silver. In the centre of the tomb was a large slab of coarse-grained limestone with a hole in the centre,[58] which can be interpreted as the base for a stone Scythian anthropomorphic statue.[59] Bronze arrowheads, a bronze quiver clasp plated with gold and the 'details of throne arms' had been unearthed as the result of looting by local treasure-hunters. The arrowheads are lost, but the gold artefacts were acquired by the Imperial Archaeological Commission and transferred to the Hermitage. The materials from this mound make it possible to trace the interaction of various cultural traditions: along with typically Scythian objects (the cauldron[60] and the terminals), there were items made in the Caucasus (a bronze riveted vessel)[61] and other production centres.

Some of the precious artefacts relate to Assyrian artistic objects, primarily the so-called 'throne arms' made of gold with amber inlays (Figure 7.1–2). They were most probably made in the last quarter of the 8th century BC.[62] Another object of Late Assyrian manufacture is a gold cylindrical finial with a relief rosette (Figure 7.5) which, according to Schultz, was found by the buried man's left shoulder. Its interpretation as part of a stool[63] was re-examined, and Lyudmila Galanina noted that it was reminiscent of the bone finials of Assyrian sceptres, a large number of which were found at Nimrud, and this interpretation is supported by Vladimir Kisel.[64] While conceding that the cultural parallels are correct, it is necessary to point out that the size, shape and decor of the artefact in the form of a 13-petal relief rosette, and particularly its material, suggests that it may instead have been part of a bracelet. Bracelets of this type were indispensable attributes of the kings and genies depicted on Assyrian reliefs.[65] Bracelets with a single rosette were frequently depicted on the wrists of kings and winged demons from the reign of Ashurnasirpal II (884–859 BC) to that of Sargon II (722–705 BC) (Figure 7.6), whereas more complex forms appear in the reign of Ashurbanipal (669–*c*. 631 BC).[66]

It may be posited that the hollow lion-headed terminals with rivet holes acquired by the Archaeological Commission in 1904 (Figure 7.3–4) are also details of an Assyrian composite bracelet which was worn as an armlet on the forearm, rather than the decoration of a stool as previously assumed.[67] Armlets were an important part of the ritual robes of kings, priests and the nobility, and were frequently depicted on Late Assyrian wall reliefs.[68] Nothing is known about the actual construction of these ornaments as they are known only from representations (Figure 7.7). Nevertheless, the attachment with dowels of the detachable finials of a bracelet in the shape of lion heads is known from a gold example from Ziwiyeh.[69] It is also possible that these finials were part of a pendant which was apparently found in the mound (according to Schultz), then sold and melted down. Sadly, only a sketch drawing of this ornament has survived.[70]

The bronze quiver clasp overlaid with gold leaf, with inlays of coloured glass and amber and with ram's head terminals (Figure 7.8), may also be regarded as of Assyrian origin, as they are virtually identical to the rams' heads on the arms of their thrones.[71] Another Assyrian piece is a bronze bowl decorated with four rows of horizontal bands of engraved lines (Figure 7.9). Fragments of its rim and sides were found during conservation of the bronze riveted vessel. The reconstructed diameter of the bowl is 18 cm and the height of its rim 3 cm: the closest analogy is a large vessel from Nimrud.[72] Other known bowls are of smaller dimensions.[73]

The famous diadem with the protomai of a griffin[74] and rhyta[75] are part of a group of artefacts which combine traditions of east Greek and ancient Near Eastern art, and the craftsman responsible probably worked somewhere in Anatolia.[76] The silver rhyton may be considered to be the work of a master with close links to the traditions of Ionian art, while the rhyton with

[57] Galanina 1997: 40.
[58] Galanina 1997: 34.
[59] Alekseev 2009: 16.
[60] Galanina 1997: 150, pl. 41, cat. 43.
[61] Galanina 1997: 148, pl. 40, cat. 42.
[62] Kisel 2003: 65.
[63] Mantsevich 1958: 200.
[64] Galanina 1997: 154; Kisel 2003: 85.
[65] Barnett 1975: pls 1–2, 4–5, 8–10.
[66] Maxwell-Hyslop 1971: 246–48.
[67] Mantsevich 1958: 200; Galanina 1997: 154.
[68] Maxwell-Hyslop 1971: 246, figs 144, 149c.
[69] Godard 1950: 51; Maxwell-Hyslop 1971: 209.
[70] Galanina 1997: fig. 29.
[71] Galanina 1997: 114; Kisel 2003: 46.
[72] Mallowan 1966: vol. I, 116, fig. 59; Curtis 2013: 171, cat. 507.
[73] Curtis 2013: 171, cats 500–506; Korenyako 2001: 59b, fig. 4.1; Muscarella 1988: 381–82, cat. 501.
[74] Galanina 1997: 134, pl. 30, cat. 38.
[75] Galanina 1997: 148, pls 35–39, cats 41–42.
[76] Kisel 2003: 55.

Figure 7. Kelermes, mound 3 Sch. artefacts from the complex and analogies: 1, semi-cylindrical hollow gold and amber object of uncertain purpose but possibly part of a throne, L 19.2 cm, Kelermes, mound 3 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1904-1/11); 2, semi-cylindrical hollow gold and amber object of uncertain purpose but possibly part of a throne, L 17.2 cm, Kelermes, mound 3 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1904-1/12); 3, gold cylindrical terminal in the form of a lion's head, possibly part of an armlet, L 4.3, W 3.7 cm, Kelermes, mound 3 Sch. (?) (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1903-1904-1/12); 4, gold cylindrical terminal in the form of a lion's head, possibly part of an armlet, L 4.3 cm., W 3.7 cm, Kelermes, mound 3 Sch. (?) (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1903-1904-1/11); 5, gold pole-top ending in a rosette, D 3.7 cm, Kelermes, mound 3 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1904-1/2); 6, representation of a bracelet with applique rosette on relief of Sargon II (after Maxwell-Hyslop 1971: fig. 148b); 7, representation of a bracelet and armlet on wall-relief of Ashurnaşirpal II (after Maxwell-Hyslop 1971: fig. 143); 8, bronze, gold and amber quiver buckle, L 8.6 cm, Kelermes, mound 3 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1904-1/13); 9, fragmentary bronze bowl, L 12.5 cm, Kelermes, mound 3 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1903-1904-1/40); 10, fragmentary gold and silver lion-headed rhyton, W 7.2 cm, Kelermes, mound 3 Sch. (The State Hermitage Museum, St. Petersburg, inv. nr. Ky 1903-1904-1/5-7)

gold overlays shows similarity to artefacts of Syro-Phoenician production.[77]

The interaction of the cultural traditions of Scythia and Anatolia is vividly reflected in rattling terminals, which were typical of the Scythian world. They are all pear-shaped, a significant departure from the earlier spherical form. The only example which reproduces the shape of earlier terminals with a spherical bell (Figure 2.7a), yet differs from them in its proportions and the method of applying the rhomboid motif which was engraved after the object was cast. One of the terminals is decorated with the head of a blunt-nosed animal with protruding ears and the tongue of a beast of prey (Figure 2.7b). The protruding ears and tongue are very similar to the interpretation of a lion's head on part of a rhyton (?) from the same mound (Figure 7.10), which has analogies in the Hittite art of Anatolia.[78] Three pear-shaped openwork terminals (Figures 2.7c–d) are crowned with griffin heads of north Ionian type: one terminal (Figure 2.7c) is of excellent quality and was clearly the work of a professional founder who superbly conveyed the shape typical of Greek art, but the other two (Figure 2.7d) look like imitations and are of very poor quality, as the griffins lack eyes and their beaks are not properly finished. It should be noted that pear-shaped terminals subsequently became the dominant type.

The materials from Mound 3 Sch. therefore demonstrate the extent of cultural interaction, where the achievements of neighbouring peoples enriched the fledgling nomadic culture. The 'royal' class of artefacts from this complex also shows the elevated social status of the deceased which is comparable with that of an Assyrian ruler.

Mound 24 (3 Sch.?)

In its dimensions and the appearance of the former excavations, this mound is closest to those excavated by Schultz, but it is impossible to determine exactly which this mound is. Nevertheless, a re-examination in 1983 produced some imposing and well-documented results which allow us to determine the place of mound 24 in the series of mounds in the Kelermes cemetery in particular, as well as in the ancient Scythian period as a whole.

An undisturbed section in the central part of the grave pit of mound 24 yielded, along with human bones (phalanges of a hand and a tooth), miniature gold plaques with loops on the back, amber inlays, fragments of bronze and iron scale armour, an iron knife, a spear, arrowheads, zoomorphic bridle accessories of bone and bronze, and pendants made of boars' fangs.[79] The burial was accompanied by nine sacrificed horses, six with parts of bridles – evidence for the continuity of this ritual. Differences in the type of equipment and decoration of the headbands show that the horses may have symbolised the participation of various groups of tribes in the royal funeral.[80] An evident new introduction, previously unknown in archaeological practice, was the custom of decorating the horses' headbands, breast straps and forelegs with strings of opaque vitreous paste beads and cowrie shells (*Cypraea moneta*),[81] which have not been found in any other burial at Kelermes and do not exist at all, as far as I know, in any early Scythian monuments in the Kuban region. Cowrie shells, which were quite widely used from the 9th to 7th centuries BC in monuments in Transcaucasus, the central Caucasus and Pyatigorye, were brought to the Dnieper forest steppes in the 7th century BC, it is believed by a people who espoused early Scythian culture.[82] They were probably only used for a short time in the Kuban region.

Although none of the horses had bridle decorations in 'Animal Style', the rein junction boxes and fang pendants found in the centre were probably part of a destroyed horse burial. Unlike Veselovsky's mounds, no composite cheekpieces were found here and only the junction boxes were decorated in 'Animal Style'. Three of these featured depictions of a curled feline predator (Figure 8.3), and two others represented sheep (Figure 8.4–5). Differences from the bridle decorations from Veselovsky's mounds can be traced, not only in the composition and design of details such as the conveying of an ear by a circle on the string of beads from mound 2 V and the heart-shaped figure from mound 24 (Figure 8.2–3), but also in the use of different motifs: the bridle decorations from Veselovsky's mounds mainly feature depictions of syncretic animals (sheep-birds) and sheep, and depictions of a curled beast of prey were recorded only on two rein junction boxes from mound 2 V (Figure 8.2).

Imported items include bone plates, possibly inlays which served as decoration for a wooden or bronze object (Figure 8.1). These inlays are very rare at early Scythian monuments and, apart from Kelermes, they have only been found in mound 16 of the Novozavedennoye-II cemetery.[83] Parts of wooden furniture with horn incrustation[84] which differ from those at Kelermes in size and shape were found in Location 13 at Karmir Blur. It is necessary to note that the Kelermes inlays are similar in size and variety of elements to the bone inlays

[77] Kisel 2003: 80.
[78] Galanina 1997: 162.
[79] Galanina 1997: 42–44, pls 12, 31, 41, cats 310–11, 313–17, 320.
[80] Galanina and Alekseev 1990: 53.
[81] Galanina and Alekseev 1990: 42.
[82] Bruyako 1999: 51.
[83] Petrenko, Maslov and Kantorovich 2000: 243, fig. 14.
[84] Piotrovsky 1950: 35, fig. 13.

Figure 8. Kelermes, mound 24. Artefacts from the complex and analogies: 1, bone inlays from furniture (?), L 0.9–3.5, D 2.2–3 cm, Kelermes, mound 24 (The State Hermitage Museum, St. Petersburg, inv. nr. 2739/13); 2, bone/horn rein junction boxes, D 2, H 2 cm, Kelermes, mound 1V (The State Hermitage Museum, St. Petersburg, inv. nr. 2737/166); 3, bone/horn rein junction boxes, W 1.7–2.3, H 1.4–1.6 cm, Kelermes, mound 24 (The State Hermitage Museum, St. Petersburg, inv. nr. 2739/29); 4, fragmentary bone/horn rein junction box, W 2.8, H 2 cm, Kelermes, mound 24 (State Hermitage Museum, inv. nr. 2739/30); 5, bone/horn rein junction boxes, W 2.5, H 2.7 cm, Kelermes, mound 24 (The State Hermitage Museum, St. Petersburg, inv. nr. 2739/72)

from mound 16 of the Novozavedennoye-II cemetery,[85] and the inlay of a couch found in room NE26 of 'Fort Shalmaneser' at Nimrud.[86] Although the exact place of manufacture of these plates cannot be determined

[85] Petrenko, Maslov and Kantorovich 2000: fig. 4.12.

[86] Mallowan 1966: vol. II, 396, fig. 323.

accurately, they are an indication of the probable 'post-campaign' construction of mound 24.

A substantial number of artefacts from this complex (arrowheads, bronze beak-shaped junction boxes, horse-bits, cheekpieces, bone 'column' fasteners, vitreous paste beads) have numerous parallels in mounds of the ancient Scythian period,[87] which supports grounds for asserting their synchronicity with 'monuments of the Kelermes type'.[88] In this regard, it is essential to stress that the materials from mound 24, which are fully comparable with materials from the Novozavedennoye-I, Novozavedennoye-II, Krasnoye Znamya and Nartan cemeteries and probably relate to the same chronological period, differ significantly from the materials from other Kelermes mounds. As one of the latest mounds on the site, mound 24 probably originates from a period when there was still no Greek pottery in the Kuban region, despite the fact that links with the east Greek world already existed and can be traced most clearly in the materials from mound 3 Sch. The arrival of ancient pottery in the Kuban region dates no earlier than the last quarter of the 7th century BC, as documented by finds of fragments of amphoras of Samos-Miletus and Lesbos manufacture and a pitcher of southern Ionian manufacture in the 1st Razmenny (Kostromsky) mound[89] situated about 40 km to the southeast of the Kelermes necropolis. The significant amount of trade with an as-yet unidentified ancient centre at that time is demonstrated by the fact that, of the pottery found at the settlement of Tarasova Balka, very close to the Kostromsky mound,[90] about 1% consists of fragments of pottery vessels made in Klazomenai and Lesbos.

The materials from Mound 1 excavated by Schultz, which abound in artefacts from the Iranian-Assyrian-Urartian orbit, require separate detailed research and have deliberately not been included in this review. Moreover, the exact location of the mound has yet to be determined as it is impossible to correlate it to any of the mounds re-examined in the 1980s.[91] The above-mentioned changes in the funerary paraphernalia in the Kelermes mounds therefore show that they were constructed over a considerable period of time and prove that it is wrong to apply the dates of monuments established on the basis of finds of ancient pottery to all the Kelermes complexes.

[87] Korenyako 2001; Maslov 2012; Petrenko, Maslov and Kantorovich 2000; Petrenko 2006.
[88] Erlikh, Kantorovich and Maslov 2015.
[89] Ryabkova and Loginova 2013: 372.
[90] Ryabkova 2015: 359.
[91] Galanina 1997: 52.

The results of new scientific analyses of gold bracelets from Taksai-1 and an iron sword from Issyk in the National Museum of the Republic of Kazakhstan

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Abstract

The British Museum held the BP exhibition *Scythians: warriors of ancient Siberia* from September 2017 to January 2018. Among the many exhibits were several important objects dating from the early Iron Age on loan from the collection of the National Museum of the Republic of Kazakhstan, including two gold bracelets from the central burial in mound 6 of the Taksai-1 burial ground and an *akinakes* from the famous burial mound of Issyk. Within the framework of scientific research conducted during the exhibition, laboratory analyses using non-destructive X-radiography, optical microscopy and X-ray fluorescence were used to study the manufacturing and decorative techniques of these objects and superficially analyse their alloy compositions. The results of these new investigations are presented here for the first time.

Keywords: Early nomads; gold; bracelets; *akinakes*; scientific research; Taksai-1; Issyk

Introduction

During the early Iron Age, different nomadic and semi-nomadic tribes inhabited present-day Kazakhstan and are defined archaeologically by various cultures such as Tasmola, Prokhorovka, Mayemir and Pazyryk. Some groups of sites are associated with tribes known from ancient or Chinese sources and therefore referred to, for instance, as Saka or Usun monuments. One of the special cultural features of this period are the presence of rich burials, including clothing decorated with numerous sewn-on plaques and jewellery, often made of gold in the Scythian 'Animal Style', and weapons also richly decorated with gold. The Taksai-1 and Issyk complexes are outstanding examples of this tradition and are described below in the context of new scientific analyses conducted on some important items found at these sites (Figure 1).

Taksai-1

Description of the site and main excavated finds

In April 2012, the archaeological section of the West Kazakhstan Regional Centre of History and Archaeology conducted an exploratory survey in the Terekti district of western Kazakhstan and identified five cemeteries and later that year excavated three mounds in the Taksai-1 burial complex. This complex is situated 2 km north of Taksai station and consists of 6 kurgans unevenly distributed in a line from the southwest to the northeast. Kurgans 1 and 2 are the largest but the others had suffered heavily from ploughing. During the 2012 season, kurgans 3, 4 and 6 were excavated but it was kurgan 6 which proved to contain the most interesting discoveries and was radiocarbon dated to the 6th–5th centuries BC. This kurgan consisted of an earth mound covering a square log cabin. The contents were badly affected by a fire which had destroyed the tomb but, as it was never robbed, the objects were still *in situ* and included items of high value. Three burials were found, the main one belonging to a woman who, judging by the accompanying finds, belonged to the elite of the early nomadic society of the southern Urals; the others belonged to the beheaded corpses of secondary burials. Five horse bridle sets were found in the tomb, four near the western wall. Other objects included gold personal ornaments, imported glass 'eye' beads, two polychrome glass vessels, a brazier, mirror, an iron knife and a walnut-wood box containing a carved wooden comb and other objects. These and other finds are discussed at length elsewhere in this volume, hence will not be repeated here.[6] A pair of gold bracelets were also found, one on each wrist of the main burial, and these are now discussed in detail below.

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[6] See in this volume the papers by Lukpanova (on the kurgan and contents), and Summerer and Lukpanova (on the comb).

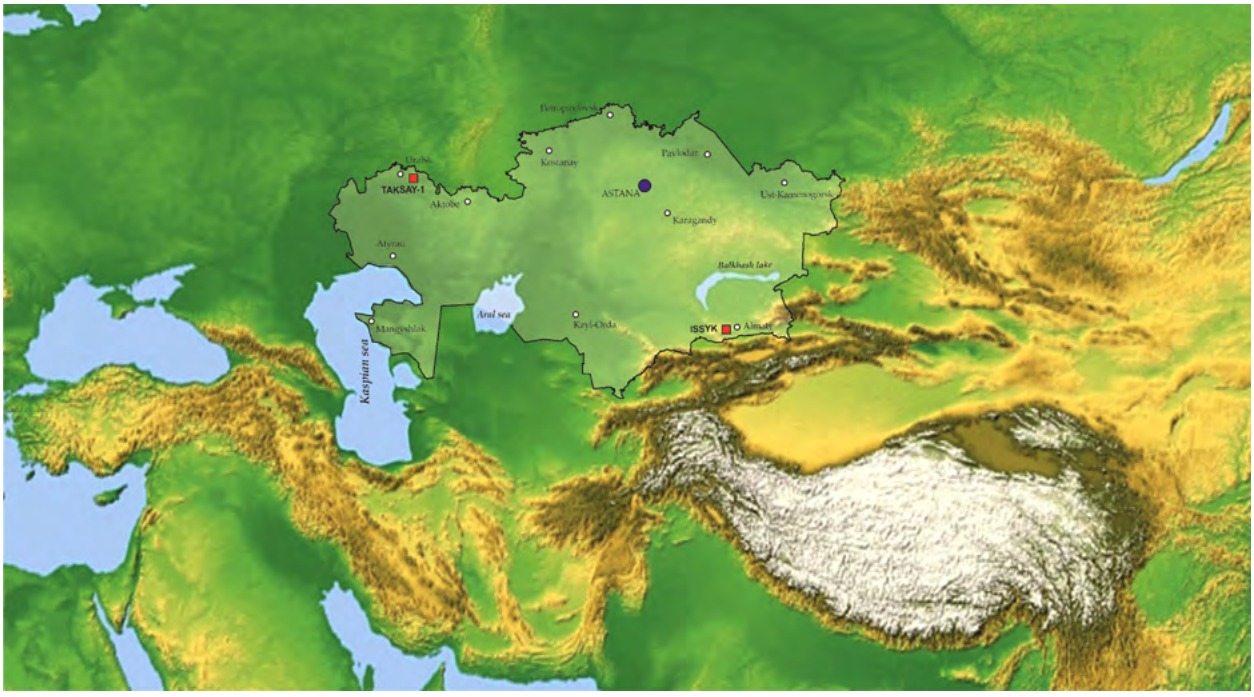

Figure 1. Map showing the location of Taksai-1 and Issyk

Pair of gold bracelets[7]

The pair of gold bracelets are omega-shaped, circular in section and possess elaborate decorative terminals, each with a fantastic feline predator with the horns of a mountain sheep (argali, *Ovis ammon*) represented in the act of pouncing on the back of a calf, although only the head of each animal is represented. A triangular cavity was cut into the centre of the forehead of each calf and in one instance still preserved a greyish-blue stone inlay. The bracelets measure approximately 7.9 x 6.5 cm and have an average weight of 182 g (Figure 2).

Omega-shaped bracelets are diagnostic of Achaemenid workmanship, and are represented on reliefs at Persepolis. Actual examples from gold, silver and bronze are known from excavations at sites of this period across the Near East, as well as in the Oxus Treasure in the British Museum.[8] The terminals of these are typically decorated with the head or body of a single species, such as an ibex, ram or lion, whereas the present examples draw on the essence of 'Animal Style' art by representing a carnivore pouncing on a herbivore. The closest parallels to those found at Taksai-1 come from Filippovka-1, also in the southern Urals, and were found on the wrists of a female individual (burial 4) in kurgan 4, which is dated between the second half of the 5th and first half of the 4th century BC (Figure 3).[9] These were also omega-shaped with terminals in the form of argalis, the bodies of which contain cavities and some still holding their original turquoise inlays. The bracelet found on the right wrist of the buried lady weighed 376.12 g, whereas that on the opposite wrist weighed 374.12 g, and the fineness of the gold is 900, equivalent to 21.6 carat gold (although this meant nothing in antiquity).

Scientific analyses

In 2014, a group of researchers from the Institute of Mineralogy of the Ural Branch of the Russian Academy of Sciences, Miass city, and the West Kazakhstan Regional Centre of History and Archaeology analysed several gold objects from the Taksai-1 burial ground using a portable X-ray Fluorescence (XRF) instrument (Olympus Innov-x α-4000). This showed that out of 125 items and their fragments, 87 contain copper in addition to gold and silver. Four analyses made on each of the pair of bracelets unsurprisingly showed a similar composition of 88.5–89.5 wt% Au, 7.5–7.8 wt% Ag and 3–3.3 wt% Cu. The authors concluded that some of the gold objects found in burial mound 6 at Taksai-1 were made from native gold whereas others were made from a natural silver/gold electrum alloyed with copper, suggesting that the elite of the early nomads of the southern Urals in the middle of the 6th–5th centuries BC either directed controlled or had access to more than one source of metal and sets of techniques.[10]

In 2018 the bracelets from Taksai-1 were studied scientifically and re-analysed in the Department of Scientific

[7] Inv. nr. тк2-930, 931 (БҚОМ-9241/19) (БҚОМ-9241/17).
[8] Dalton 1964: 32–34, pl. I.
[9] Yablonsky 2013: 25–26, 94–95, cats 356–57.
[10] Blinov *et al.* 2014.

Figure 2. Pair of gold bracelets from Taksai-1 burial mound (Tk2-931), western Kazakhstan, 6th–5th centuries BC (photograph © National Museum of the Republic of Kazakhstan, Nur-Sultan)

Figure 3. Pair of gold bracelets from burial 4 at Filippovka-1, southern Urals, Russia, 6th–5th centuries BC (after Yablonsky 2013: 95, cat. 356)

Research at the British Museum in order to throw light on the manufacturing techniques and re-examine the gold composition, and the results given below.

Methodology

Computed radiography (CR) was carried out on the bracelets using the maximum X-ray voltage of 450 kV and beam current of 1.55 mA, with a focal spot selection of 0.4 mm. The X-ray beam was filtered with 3.3 mm brass in order to remove the lower energy photons from the spectrum (these photons are more likely to be scattered, reducing image contrast). An exposure time of five minutes and a 10" x 12" CR plate (Computed radiography imaging plates: Carestream Industrex Flex HR) were used. CR was selected in this case over Digital

Radiography, because it is a more convenient approach for objects which are most secure when laid flat (the X-ray beam in this case is oriented vertically downwards), and provides images with a higher pixel density. Photomicrographs of tool marks and surface texture were recorded using a Keyence digital microscope at various magnifications (20x to 100x). The composition of the gold alloys was analysed using a Bruker Artax spectrometer operating at 50 kV and 500 µA, with a collimated X-ray beam of 0.65 mm diameter and a counting time of 200 seconds. However, the results should be regarded as semi-quantitative only, because analyses were acquired on clean but non-abraded surfaces. There may be some discrepancy between the analyses of the surface and the core, due to the penetration limits of the X-ray beam and possible loss of base metals in superficial layers during burial through corrosion or during manufacture through deliberate surface treatments.[11] The original core alloy composition may contain more silver and copper than detected.

X-radiography

The radiographs confirm that both bracelets are entirely solid with no evidence of a hollow interior, and instead have a relatively uniform penetration throughout (Figure 4). This confirms the initial impression offered by their relatively heavy weight. It is highly possible that the method used for casting was the lost-wax cast technique, since this was widely used at this period and was the method initially suggested in the excavation report.[12]

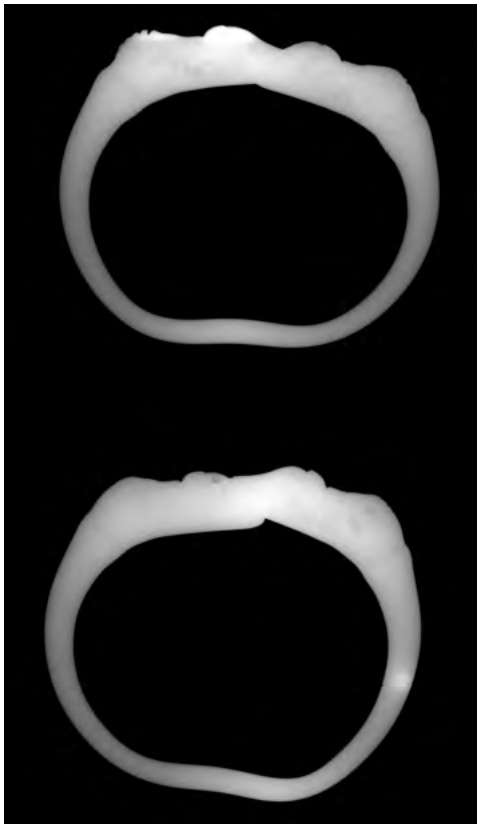

Figure 4. X-radiograph of gold bracelets Tk2-931. The radiograph shows strong X-ray absorption by the bracelets, blurred edges due to X-ray scatter, and a lack of visible internal or external detail, indicating that the bracelets are solid, and most likely produced by casting (radiograph: D. O'Flynn)

Optical/digital microscopy

Digital photomicrographs of the bracelets showed several casting defects (Figure 5). A number of relatively large platinum group elements (PGE) inclusions could also be seen on the surface (Figure 6), indicating that the gold used to manufacture these bracelets was alluvial, i.e. from a secondary riverbed deposit rather than a

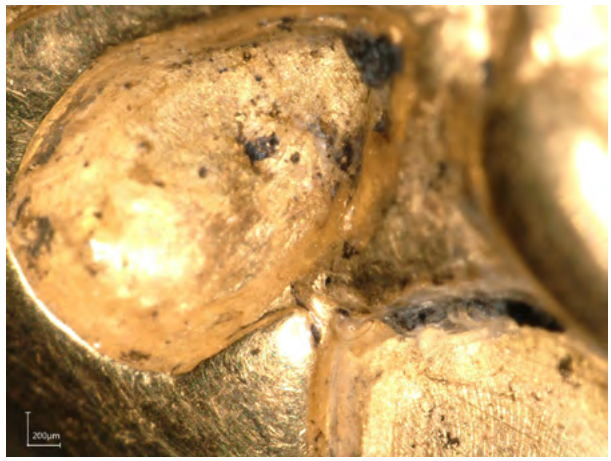

Figure 5. Close-up view of a casting defect (arrow) on a calf's neck. The hole left after casting is partially covered by a transparent material applied over the inventory number written close to this area (scale bar: 0.5 mm, 30x; photomicrograph: A. Mongiatti)

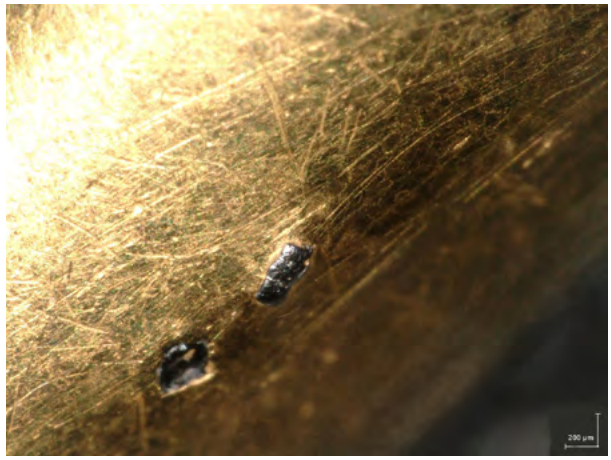

Figure 6. PGE inclusions on the omega-shaped body; these two are relatively large and visible to the naked eye and are most likely responsible for the bright spot seen on the radiograph (Figure 4) (scale bar: 0.2 mm, 100x; photomicrograph: A. Mongiatti)

[11] Hall 1961; Cowell 1977.

[12] Sdykov and Lukpanova 2013: 182–87.

Figure 7. Top view of a feline's head showing the designs chased in the metal after casting and the highly burnished surface; note the remains of a dark inlay in the grooves of the feline's horns at the top of the image (scale bar: 1 mm, 20x; photomicrograph: A. Mongiatti)

Figure 8. Grooves on a feline's neck on bracelet, most likely originally inlaid with a dark material similar to the one seen in Figs 10-11; these grooves were most likely initially carved in the wax and further accentuated by chasing the metal directly after casting (scale bar: 0.5 mm, 50x; photomicrograph: A. Mongiatti)

Figure 9. Light coloured stone in a triangular cell on the forehead of a calf (scale bar: 1 mm, 20x) (photomicrograph: A. Mongiatti)

Figure 10. Partially broken dark glassy-looking inlay in a cell on top of a calf's head (scale bar: 0.5 mm, 50x; photomicrograph: A. Mongiatti)

Figure 11. Light grey inlay in two of the grooves of a feline's horns; note the similar dark glassy-looking inlay to that shown in Figure 10 at the front of the image (scale bar: 0.5 mm, 50x; photomicrograph: A. Mongiatti)

primary ore.[13] The surface of the bracelets has been heavily worked by hand after casting and the surface has been finely burnished to give a smooth and lustrous finish to the artefact (Figure 7). Chasing has been used to enhance the animals' features in relief and further decorate the pieces (Figures 7–8), as was previously noted by Shablavina.[14] A pale stone is present in a closed cell on one of the calves' heads (Figure 9) but most of the inlays in the other cells are missing. There are also remains of a dark glassy-looking inlay material in other cells and grooves on the predator's horns and its neck at the base of the terminal (Figure 10). The use of a dark inlay created a strong colour contrast with the gold and has a striking visual effect. Moreover, there is a grey inlay filling part of the feline's horns (Figure 11): this is different in character to the darker glassy-looking inlay and further investigation would be needed to identify

[13] Ogden 1977; Meeks and Tite 1980.
[14] Sdykov and Lukpanova 2013: 184.

it and understand whether it is original or was a later replacement in antiquity.

XRF

For both bracelets, the average silver content[15] (*c.* 8 wt% Ag) is consistent with that of a natural alluvial gold alloy (Table 1).[16] However, in such alluvial deposits, the copper concentration usually remains below 2 wt% so for these two artefacts, which show an average content of *c.* 3 wt% Cu, it might reflect deliberate addition of copper to a natural gold / silver (electrum) alloy. This is similar to the alloy used to manufacture the well-known chariot model in the Oxus Treasure, however different from the apparently unrefined electrum used to manufacture the Scythian cast bracelet in the Oxus Treasure.[17] The alloy identified here shows a higher copper content than Scythian cast gold artefacts from the Siberian Collection of Peter the Great in the State Hermitage Museum.[18] The preliminary qualitative analysis of the inlays seems to suggest that the pale green stone on the calf's head is turquoise, as it is rich in copper and iron and also contains some phosphorus, while the dark inlay appears to be a glass containing potassium, calcium, lead and a number of other minor elements. Complementary Raman spectroscopy for the stone and quantitative analysis of the glass would be needed to discuss these preliminary results further.

	Au	Ag	Cu
Gold bracelet NMRK VKOM i 9241-19	88.7	7.9	3.5
Gold bracelet NMRK VKOM i 997 yp	89.7	7.4	2.9

Table 1. Semi-quantitative XRF analysis on visually clean but non-abraded surface areas of both gold bracelets (normalised elemental concentrations in wt%)

Issyk

Description of the site and main excavated finds

The Issyk complex is situated on the left bank of the river Issyk, 50 km east of Almaty in southeast Kazakhstan. It was a cemetery of 45 large burial mounds which extend for three km from north to south and are believed to have been the tombs of elite nomads. These mounds measure between 30 and 90 m across and 4–15 m in height: almost all have deep pits on the summits, indicating that they have been looted in the past. On the slopes of the largest burial mounds, there are concentrations of pebbles left from looting and water erosion, and they are surrounded by flat oval pebble accumulations. In one case, the mound was found not to have been completed plundered. This mound was located on the southern outskirts of the western half of the cemetery which is divided into two by a modern road and a large irrigation canal. The diameter of this mound is 60 m and it is six m high. At the top of the slope there is a large looting pit measuring 12 m across and 2.3 m deep. The mound was completely excavated. Sections through it show that it had been built up in three or four stages of pebbles alternating with crushed stone and clay, a depth of 1.2 m from the ancient ground surface, two burials were discovered, one in the centre and one to the south. The central grave was completely destroyed by the looters but the lateral grave was undisturbed and its contents completely preserved.[19]

This lateral grave was situated 15 m south of the central one and between 10 and 12 m from the southern edge of the mound. The burial chamber was constructed from logs of Tien Shan spruce measuring between 1.5 and 3 m long, and 25–30 cm thick, and the chamber measured 2.9 x 1.5 m on the interior and 3.3 x 1.9 m on the exterior. In the southern and western parts of the tomb chamber were placed dishes, and in the northern half were the remains of an individual who had been placed on his back on the board floor with his head to the west. He originally stood 1.65 m high and among his remains were large quantity of dust and the remains of iron clips. A huge number of items were also found: on and beneath the skeleton were numerous gold leaf appliqués for his clothing, headdress and shoes, and nearby there were weapons, toiletry items and other utensils. Most of the gold plates, badges and small plaques of different shapes belonging to the headdress were *in situ* and located above the cranium, occupying an area of 65 x 30 cm, implying a tall conical shape and topped with a gold statuette of an argali. On the left side of the head there was a gold earring, and a gold comb was placed by the neck. Both on and under the bones of the body, extending from the neck to the thighs, there was a continuous layer of golden appliqués and small beads. Massive quadrangular plaques were found on top of these in the waist area. Small gold rectangular plaques formed four vertical lines along the large femur bones. A gold ring was among the phalanges of the right hand; a second ring was found below the floor boards. The remains of a long iron sword and its scabbard lay beside the right leg and three gold beads were found next to its hilt. On the left, between the bones of the left hand and the body, was an iron dagger, discussed in greater detail below. Two large badges and two massive belt buckles had survived from its scabbard. Under the dagger there were plaques and belt buckles. On the left side of the skeleton, opposite the elbow, there were the remains of a pole and a golden arrowhead. Above

[15] Elemental concentrations on the surface only: as mentioned above, owing to possible surface phenomena, the core alloy may contain more silver and copper than detected.
[16] Ogden 2000: 162.
[17] Mongiatti, Meeks and Simpson 2010; Mongiatti 2017: 315, cat. 226; scientific research on the rest of the collection is underway.
[18] Semi-quantitative X-ray fluorescence analysis carried out at the Department of Scientific Research of the British Museum to be published and discussed elsewhere.
[19] Akishev 1978.

Figure 12. Modern reconstruction of 'the golden man' from Issyk (National Museum of the Republic of Kazakhstan)

there were the remains of a tree and a golden spiral ribbon. Next to the head of the individual was a large copper alloy mirror with a piece of ochre. Vessels of pottery, wood, bronze and silver were arranged around the southern and western walls of the chamber, and included jugs, bowls, dishes, a ladle and a tiny shallow silver dish with a two-line alphabetic inscription on the underside.[20] A silver spoon with a (fragmented) pointed oval bowl and a long handle terminating in a bird's head is similar to examples excavated at Pasargadae and must be an Achaemenid import.[21] In total over 4,000 gold items were found in this tomb, hence the individual has gained the popular name of the 'golden man' (Figure 12).

Iron akinakes[22]

The object discussed here is a short sword belonging to a type known as an *akinakes* (Figure 13). The dagger has a zoomorphic pommel in the shape of a pair of addorsed griffins' heads viewed in profile and facing one another: their beaks are heavily curved and their eyes and ears marked with curls.[23] The pommel is covered with gold leaf, the ellipsoidal hilt wrapped with twisted gold wire, and the guard originally decorated with small gold plates. Each side of the blade displays a long, narrow, tapering ribbon-like gold plate with serrated edges, which is decorated along the centre with rows of animals in miniature. These lifelike animals include a snake, fox, hare, leopard, goat, boar, wolf, argali and tiger (nine figures) on one side, and a snake, fox, hare, argali, gazelle or roe deer, boar, wolf, argali, hare, wolf, boar and half-body of some animal on the other (twelve figures). All heads face the handle and the figures alternate in such a way that the bodies of two adjacent animals are alternately upside-down. The animals are depicted in a so-called 'pawing' pose with their bodies resting on their paws, their snouts placed to the ground and their rumps and shoulders highlighted with volute-shaped coloured stone inlays.

This general form of short sword has many analogies across the Eurasian steppe at this period. Blades with ellipsoidal handles are found in the tombs of Saka nomads who lived near the Tian Shan during the 4th–3rd centuries BC. A number of daggers with ellipsoidal handles are also noted in the forest-steppe of Altai, where they are dated to the 4th and beginning of the 3rd centuries BC, but possibly beginning in the 5th century BC. Single swords and daggers of similar type are also known from early Sarmatian territory in the southern Ural region where they are dated to the 4th–3rd centuries BC, and other versions are found in Bactria. Moreover, bladed weapons decorated with gold are also known from the 7th century BC, notably on an *akinakes* from Arzhan-2 in Tuva,[24] as well as two blades from kurgans 1 and 4 (burial 2) at Filippovka-1 in the southern Urals. In one of these cases, the blade was decorated with snake-like designs and the hilt was tightly bound with gold wire.[25] The second example is even more elaborate as the blade has a gold midrib added to the centre, the remainder of the blade is decorated with outline designs of different

[20] Akishev 1978: 53–60, pl. 34; Simpson and Pankova eds 2017: 302, cat. 216; the inscription has attracted different interpretations but has so far defied reliable translation.

[21] Akishev 1978: 38, pls 34–35; Simpson and Pankova eds 2017: 302, cat. 217 (the published photographs are slightly misleading as the end of the handle is reversed at right-angles rather than at 90°, and it was displayed in the correct manner in the exhibition at the British Museum in 2017).

[22] Akishev 1978; Simpson and Pankova eds 2017: 224, cat. 140.

[23] Akishev 1978: 104, fig. 9.

[24] Chugunov, Parzinger and Nagler 2010: pls 61, 76.

[25] Kamaleev 2018: 276, cat. 833.

Figure 13. Iron *akinakes* with gold decoration, L 48, W 7.7 cm, present weight 843.7 g (National Museum of Kazakhstan, inv. nr. ҚРҰМтк1-1842 (ГМЗ ОФ-896 ГМЗ СФ-82)

scenic episodes, including a rider dismounting, a rider spearing a boar and a pair of dismounted riders killing a deer with their swords; the guard and hilt are decorated with further 'Animal Style' designs.[26]

Scientific research

The compositions of 33 gold items from this unrobbed tomb at Issyk were analysed with a portable XRF as detailed above. The results indicate a gold content of between 66 and 87 wt% and a silver content from 12 to 28 wt%. Copper concentrations range from 0.1 to 1 wt% for one half of the samples, and from 1.1 to 7.8 wt%. Rings have the highest copper content with 6-8 wt% Cu, 81-84 wt% Au and 9-11 wt% Ag. Most items were made of low-grade gold with several showing higher purity and others with very low copper content being made of natural electrum.

In 2017 the famous iron sword (*akinakes*) with gold decoration was studied in the Department of Scientific Research at the British Museum and the results given below.

Methodology

Digital radiography (DR) was carried out on the artefact using the maximum X-ray voltage of 450 kV and beam current of 1.55 mA, with a focal spot selection of 0.4 mm and a PerkinElmer XRD 1621 AN15 ES flat panel digital detector, with a 410 x 410 mm active area and 0.2 mm pixel pitch. Images were integrated over 20 frames of 500 ms each (total exposure time of 10 seconds). The X-ray beam was filtered with 3.3 mm brass in order to remove the lower energy photons from the spectrum (these photons are more likely to be scattered, reducing image contrast). X-radiographs were acquired with the artefact rotated to different orientations about the vertical axis. DR was selected over CR for this artefact, because it allows the rapid acquisition of a series of radiographs at different object orientations (about the vertical axis), providing more information on three-dimensional structures when compared with a single radiograph. The gold composition of the decoration was analysed using a Bruker Artax spectrometer under the same operating conditions as described above and with the same limitations regarding the interpretation of the results due to potential surface effects.

Optical microscopy

Although this artefact has been presented as an iron sword, its microscopic study reveals a surface texture in several areas, which is characteristic of wood. Moreover, one edge of the so-called 'blade' is very square and smooth and does not resemble the typically sharp edge of a bladed weapon. It therefore appears that the blade is still covered in the remains of its original scabbard which was made of organic material. There is a clear gap between what appears to be the blade and surrounding scabbard on the broken cross-section of the main fragment (Figure 14), which further suggests

Figure 14. Gap (indicated by the arrow arrow) between what is most likely the scabbard and the iron blade inside it: the shiny areas correspond to where some adhesive or consolidation material has been applied (photograph: A. Mongiatti)

[26] Yablonsky 2013: 86–87, cat. 296.

Figure 15. Strip of chased/repoussé or stamped gold decoration in the centre of the blade/scabbard: note the red inlays still in their cells (photograph: A. Mongiatti)

Figure 16. Strip of gold decoration in the centre of the broken tip of the sword/scabbard: note the red inlays and small teeth on either edge of the strip (photograph: A. Mongiatti)

that the presently visible material is not the blade itself but the scabbard. This cross-section also shows clear traces of consolidation material or adhesive, which appears to have been used to re-attach the broken tip to the main part of the sword. The cross-section of this broken blade tip also shows traces of previous restoration. The sword/scabbard displays shiny areas, where conservation materials have been applied in the past. The central gold decorative strip on the blade may has been repeatedly hand-worked from the front and back to create the design (Figure 15), or stamped, i.e. hammered from the front into a die. There are a few red and green inlays, although most have now been lost. As mentioned above, the gold strips display rows of small teeth on both edges, possibly originally intended to fix the strips to the organic material making the scabbard (Figure 16). It would have been possible to bend these teeth into wood or leather, by hammering them so that the strip was mechanically attached to its support.

X-radiography

The radiographs of this artefact reveal a complex internal structure in the area of the hilt and guard (Figure 17). A ball of wire of similar density to the main material composing the sword/scabbard (rusted iron and a textured organic material?) appears to fill the guard, with some straight wires extending up into the blade. This structure is not original to the artefact but is the result of previous conservation after excavation. The internal wires most likely served as an armature for the conservation material used in the reconstruction to be held in place while setting. This internal structure has substituted the tang, which is clearly broken at the

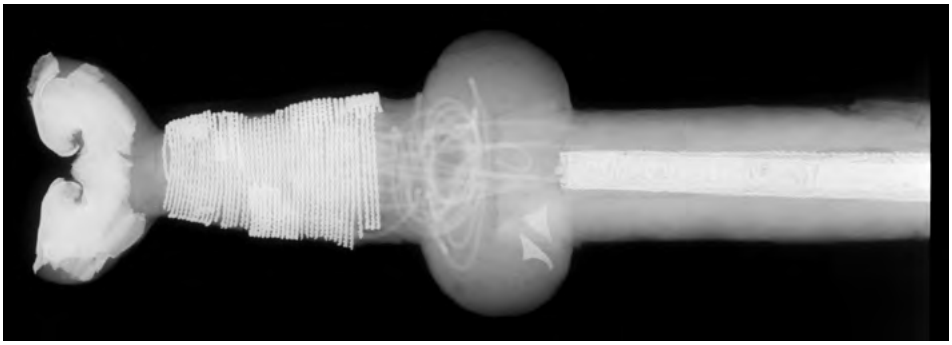

Figure 17. The brighter regions on the radiograph correspond to gold decorations on the pommel and grip of the hilt and the blade/scabbard (digital X-radiograph: D. O'Flynn)

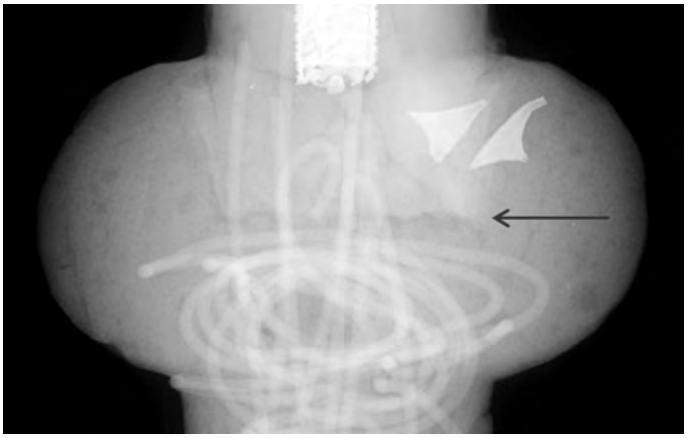

Figure 18. Tang of the *akinakes*, broken at the base of the blade (in line with the black arrow), which has most likely led to the dagger being broken in two, and the internal structure made of wires of the subsequently reconstructed hand guard (digital X-radiograph: D. O'Flynn)

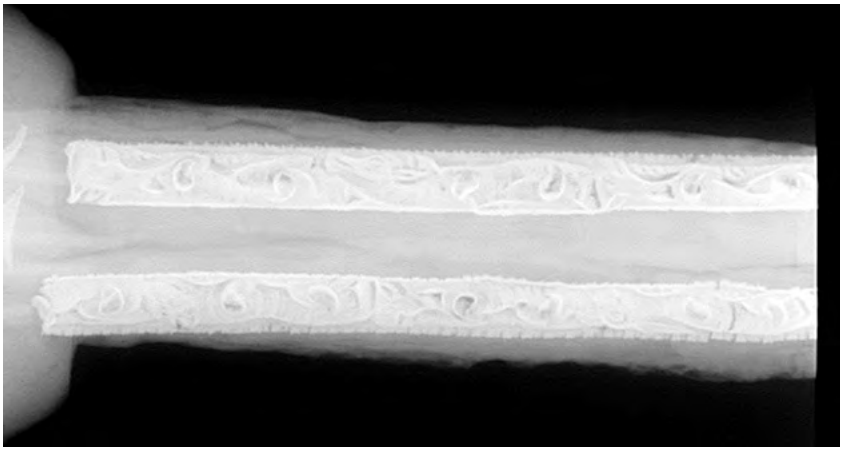

Figure 19. Decorative gold strips on either side of the blade/scabbard (digital X-radiograph: D. O'Flynn)

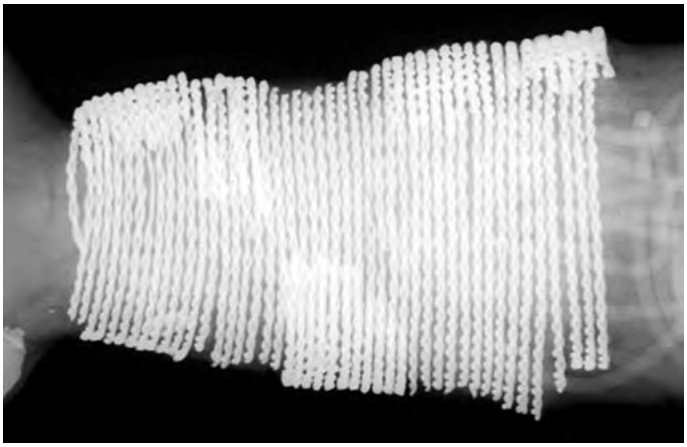

Figure 20. Decorative gold wire/s wound around the hilt (radiograph: D. O'Flynn)

base of the blade and would have originally extended at least into the guard and most likely inside the hilt in order to prevent fracture on impact (Figure 18). It is thus no surprise that, at some point in its post-excavation life, the sword broke in two. As the part of the tang, which would have been inside the handle is now missing, it is impossible to know precisely how the dagger was constructed and how far the tang originally extended into the handle. Overall it is relatively difficult to see any difference in absorption on the radiographs between what could have been the scabbard and blade as the iron blade has corroded heavily and corrosion products have grown and blended with the surrounding organic materials. Due to its much higher density, the gold appears very clearly and sharply on the radiographs and shows the decoration in more detail (Figure 19). The wires are all missing in at least one section and it is almost impossible to follow how they were wound around the hilt (Figures 17, 20). However, from a technical point of view it seems more probable that the hilt was decorated with a series of pairs of twisted wires wound once around the hilt with their ends soldered together, as it might have proved difficult to handle such a length of twisted wire as seen on the sword.

XRF

Two semi-quantitative analyses of visually clean surface areas of the gold pommel sheet and wires showed them to contain c. 88 wt% gold with c. 8 wt% silver and c. 4 wt% copper (Table 2). Although more analyses would be needed, these initial results fit relatively well with several surface XRF analyses recently carried out on Scythian artefacts from the Oxus Treasure made of gold sheet.[27] The preliminary qualitative analysis of the red and green inlays suggests that they are both stones, rich in iron and copper respectively, instead of glass and therefore most likely carnelian and turquoise although complementary analysis such as Raman spectroscopy is required for confirmation.

Conclusions

The sites of Taksai-1 and Issyk are important archaeological monuments for the appreciation of elite

[27] Mongiatti 2017.

	Au	Ag	Cu
Sword Mtk1-1842 gold sheet pommel	86.4	9.2	4.4
Sword Mtk1-1842 gold wires hilt	89.2	6.5	4.2

Table 2. Semi-quantitative XRF analysis of visually clean but non-abraded surface areas of the gold decoration on the iron sword (normalised elemental concentrations in wt%)

material culture among the early Eurasian nomads of these parts of western and southeastern Kazakhstan respectively. Although the excavations and finds have been published and previously studied in detail, the loan of some of the finds to the British Museum provided an exceptional opportunity to use scientific analyses to start answering some new questions about their production techniques and lay the foundations for future collaborative scientific studies of this material.

The pair of solid gold bracelets from Taksai-1 was cast from alluvial gold, as shown by the numerous PGE inclusions visible on the surface of the body and terminals. From preliminary surface analysis, the gold alloy seems to naturally contain *c.* 8 wt% silver with *c.* 4 wt% of copper, which was most likely intentionally added and is higher than previously analysed Scythian cast artefacts. After casting, the bracelets were chased in order to enhance the animals' features in relief and then finely burnished in order to create an attractive smooth and lustrous surface. There are remains of a pale stone inlay, most likely turquoise, on one of the calves' heads and a dark vitreous inlay in various cells and grooves on the felines' horns and neck. Further analysis of these inlays would be required to confirm their nature and composition. The contrast between the dark inlays and the gold would have been visually striking when the bracelets were worn although most of the inlays became detached and were lost prior to burial.

The short sword from the burial mound of the 'golden man' at Issyk was worn by an elite individual, judging by the quantity of gold attached to his clothing, and accompanied a longer sword. The gold decoration on the present short sword was previously assumed to be part of the iron blade, as found in the grave of the central high-status individual at Arzhan-2 and dating to the 7th century BC: in that case there are different interpretations as to whether the gold was inlaid into the iron, as argued by Barbara Armbruster,[28] or adhered to the surface as an overlay, as proposed by Raphael Minasian.[29] Scientific analysis and a cross-section would be helpful in these cases but it is worth noting that several layers of thin gold sheet can be applied to a surface without much difficulty and can be smoothed with a burnishing tool to provide good adherence. Moreover, gold does form an alloy with iron (blue gold) so it is possible that the very gentle application of heat might allow sufficient diffusion at the interface to permit gold sheet to adhere to the iron surface without the use of an adhesive.[30] However, in the present case, the scientific analysis suggests a third interpretation for the Issyk short sword as the wood texture visible in several areas on the iron sword appears to represent remains of the scabbard, which containes the blade. Both scabbard and blade have now become intermixed owing to the iron having corroded heavily and interpenetrated the surrounding organic material. The tang is broken at the base of the blade, which may have led to its fracture at some previous occasion, and its subsequent modern reconstruction, as shown by the mesh of wire inside the guard and extending into the scabbard. There is evidence of a transparent adhesive or consolidation material used to attach the two separate parts of the sword together. The decorative gold strips on either side of the blade/scabbard were worked into shape, either by stamping into a die or by chasing. Rows of small teeth on either edge of both strips were probably used to mechanically attach the latter to their organic support. Remains of red and green inlays are still visible in drop-shaped cells; these seem to be semi-precious stone, most likely carnelian and turquoise, but further analysis would be required to confirm. Multiple pairs of twisted wires were wound around the hilt for decorative effect.

There are still unanswered questions but the scientific analyses carried out at the British Museum have added some important new details and a better understanding of the manufacturing technologies of these objects from Taksai-1 and Issyk. They build on recent and ongoing scientific investigation of Achaemenid and Scythian precious metals in the British Museum and the State Hermitage Museum, and illustrate the importance of collaborative research, in this case on the occasion of the first loan to Britain by the National Museum of the Republic of Kazakhstan.

[28] Armbruster 2009; 2010.
[29] Minasian, this volume.
[30] The authors are very grateful to Dr Paul Craddock for his additional comments on this matter.

Secrets of Achaemenid production of personal ornaments and vessels

Ekaterina A. Shablavina[1]

Abstract

Not all objects found at Scythian sites were made locally and there is evidence for a small number of long-distance imports from some sites and collections, including some gold and silver objects which have close parallels from the Achaemenid empire. This paper examines some of these through the context of similarities of manufacturing techniques. Among Scythian antiquities we find gold and silver artefacts with sculptural details, varying in style and function, which have close parallels from the Achaemenid empire. There is a common belief that these were created by casting and then re-worked from the outside. A thorough analysis of the surface traces allows us to determine the different techniques used for manufacturing such objects. This paper examines some of these by comparing similarities of manufacturing techniques, and proposes a new interpretation as to how they were made. The principal technique used in the production of sculptural details and decoration on Achaemenid artefacts has been called the *basma* technique, whereby thin metal is thought to have been laid over a carved matrix and the underlying relief smoothed or bent into it. In other cases, the details were cast from lost-wax models and this technique was used to cast both hollow and solid objects. It may be that all three techniques of making artefacts are connected to chronological and regional differences in the manufacture of objects from precious and non-ferrous metals in Achaemenid production.

Keywords: *Basma* (matrix) technique; lost-wax casting; Achaemenid metalworking; Taksai-1; Filippovka; Siberian Collection of Peter the Great; Oxus Treasure

Introduction

Scythian craftsmen excelled in the working of multiple media, including metals as well as bone, horn, wood, leather and felt, but their own products were distinguished in style and technique from Greek and Achaemenid objects. This paper examines a small number of objects, some recently excavated and others from the Siberian Collection of Peter the Great, which appear to be Achaemenid imports, and compares them with objects found inside the Achaemenid empire. Despite the fact that these objects have been repeatedly studied and written about, information about their method of manufacture is often incorrect or limited to the listing of names of techniques. Achaemenid works of applied art not only have artistic merit but also bear traces which help to identify the manufacturing techniques and tools used, as well as other characteristics of the subsequent use and repair of the finished items. A thorough traceological analysis enables us not only to determine the methods and characteristics of the production of the objects but also to trace their subsequent history. The basma (matrix) technique.

In the context of the history of ancient metalworking, the so-called *basma* (or matrix) technique used to make relief hollow elements was first defined by Dr Raphael Minasyan.[2] By studying artefacts from different periods and archaeological cultures, he proposed that this method of manufacture of hollow elements was widely used in antiquity. The earliest archaeological evidence for this appears to date to the 4th millennium BC, judging by traces on gold objects found at the ancient settlement and burial mound 36 of the cemetery at Varna, in present-day Bulgaria.[3] The elements for these thin-walled objects were made without soldering. Although the matrix under the metal sheet is absent, it is assumed to have been wood. During the Bronze Age, wood was carved to make matrix-supports for a variety of items, from vessels to beads, as we can see from other finds from burial mounds at Maikop and stanitsa Novosvobodnaya in the northern Caucasus, as well as Ur in southern Iraq.[4] This technique was widely employed across the ancient world during the 3rd and 2nd millennia BC judging by other finds from Trojan hoards, Crete, Mycenae and western Europe.[5] Those ancient Near Eastern artefacts from the first half of the 1st millennium BC which we have examined were also determined to be whole sculptural covers with no seams on the surface as they were made using individual wooden matrices, although the existing technology meant that the same matrix could have been used to create identical figured elements. After the shaping of the cover, the matrix was burnt Around the mid-

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[2] Minasyan 2014: 226–38, 353–68.

[3] Minasyan 2014: 358.

[4] Piotrovsky and Piotrovsky eds 1998: 85, 88, 89; Eluére 1989: 160, 175.

[5] Minasyan 2014: 359; Danilova, Treister and Pruss eds 1996: 80–93; Karo 1930: 56, 109–10, 114, 117, 120, 125, 131, pls CIII, CIV, CVIII, CXI, CXIV, CXX, CXXVI; Egg and Pare 1995: 242, 247, pls IV, IX.

1st millennium BC the trend in the manufacturing of hollow objects changed and complete hollow sculptural elements began to appear among Near Eastern and Greek artefacts, with hollow details showing seams caused by the cutting of the sheet metal to remove the matrix. This technique enabled identical items to be made.

Bracelets from Taksai-1 and the Achaemenid empire

In 2012, a pair of gold bracelets dated by the excavator to the 6th to mid-5th centuries BC was excavated in a burial mound in cemetery 6 at the site of Taksai-1 in western Kazakhstan, and worn by an elite female individual (Figure 1).[6] The terminals are decorated with a pair of heads decorated with turquoise inlays which represent a horned predator attacking a bovine. The surfaces are worn, almost all the inlays are missing and the remaining stones bear traces of burning from when the tomb caught fire. Both bracelets were made in the same way and were soldered from different parts. The hoops widen slightly at the ends and were forged from two gold thick rods which were slightly bent in the centre. The four terminals were made separately by modelling thin cylindrical caps onto a matrix, following the so-called *basma* technique, whereby thin metal was laid over a carved matrix and the underlying relief smoothed or bent into it (Figure 2).[7] Unfortunately, the tooling marks on the front of the hollow terminals do not allow us to establish exactly how these hollow blanks were made: whether by casting with subsequent chasing or by folding the metal sheets into cylinders which were then pinched in the centre. Each cylinder was placed on the carved matrix, and smoothed onto it in order to create the relief (Figure 3.1). If we compare the shape and location of the details on these terminals, we can see that they are identical and made using the same carved matrix (Figure 2). The recesses, as well as certain areas of the surface of the relief elements, bear longitudinal grooves which indicate the use of sticks (Figure 3.1). Judging by the precise geometry of the objects and the depth of the deformed metal, which mirrors perfectly that of the matrix, the latter is presumed to have been made of metal or hard wood. After shaping the relief cover, it was necessary to extract the matrix: this must have been done by cutting the gold sheet in the recessed areas, such as along the centre of the lion's head, behind its horns and along the neck, and then carefully enlarging the incisions in order to remove the matrix (Figure 3.2). The edges of the hollow gold shell were then soldered together along this cut line, judging by the presence of soldering seams on the lion and at the junctions between the terminals and the hoop of the bracelet (Figure 3.3). At the next stage,

Figure 1. A pair of gold bracelets with turquoise inlays from Taksai-1, burial mound 6, western Kazakhstan, made using the *basma* technique and soldering, 500–450 BC (National Museum of the Republic Kazakhstan, Astana, inv. nr. TK2-931; photograph: E. Shablavina)

before the thick wires of the bracelets were twisted and given their final shape, the pre-manufactured hollow terminals were soldered onto the ends of the open hoops, and there are solder seams in the places where the terminals were joined to the hoops.

Apart from the setting in the centre of the bovine head, all of the inlay recesses take the form of cells or box bezels (Figure 3.2). These were shaped on the matrix during the manufacture of the hollow terminal. In contrast, the central transverse triangular hole in the bovine head was made after the terminal was completed and, in this case, three radial cuts were made on the forehead to form a triangular hole with perpendicular walls, and a triangular bone inlay inserted within (Figure 3.4). The result was a socket with precise facets and folded-in edges. In theory, this central setting could also have been made on the matrix like the others but

[6] Sdykov and Lukpanova 2013: 124–37, 183–87; see also Lukpanova, Summerer and Lukpanova, and Satubaldin *et al.*, this volume.
[7] Shablavina 2015: 229.

Figure 2. The identical hollow terminals on these bracelets from Taksai-1 were made using the same matrix (National Museum of the Republic Kazakhstan, Astana, inv. nr. TK2-931; photograph: E. Shablavina)

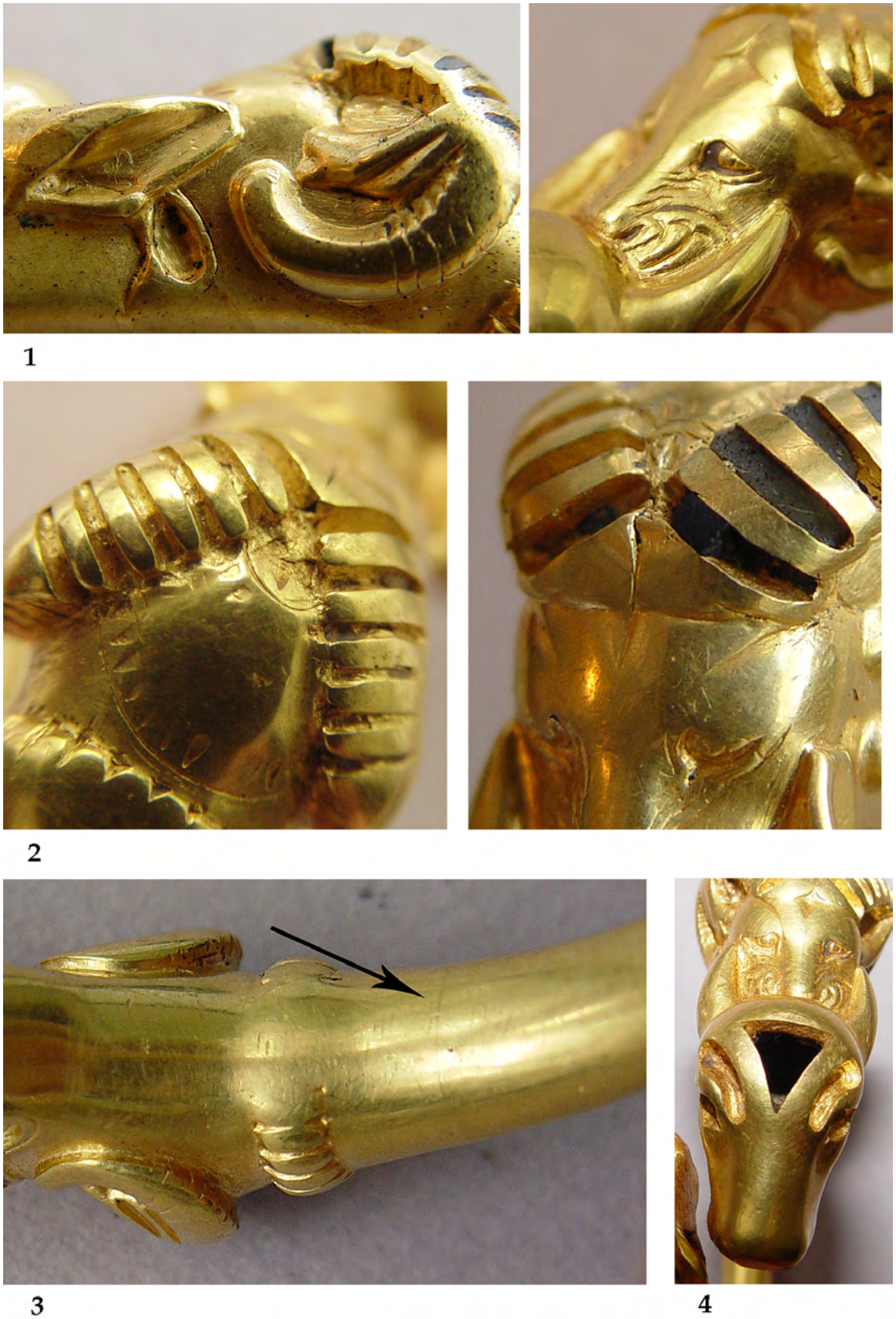

Figure 3. Examination of the gold bracelets from Taksai-1 reveals further technological details: 1, longitudinal smoothing marks on the matrix; 2, cut marks of the gold sheet cover at the centre of the lion's head and behind its horns; 3, a solder seam on the junctions between the terminals and the hoop of the bracelet; 4, box bezels were shaped on the matrix and the central transversal triangular technological hole (National Museum of the Republic Kazakhstan, Astana, inv. nr. TK2-931; photograph: E. Shablavina)

the difference in its production is due to the fact that it functioned as a technological hole whereby a now-missing ductile material had been inserted through it so as to enable the craftsman to modify details of the relief and protect the hollow sculptural terminals from accidental mechanical damage before filling the aperture. This filling was also used as a substrate for the insert as the recess had no back. The recesses lack visible remains of adhesives used to secure the inlays and its identity is therefore unknown.

Armlets and bracelets characterised by this kind of construction and manufacturing technique – i.e. *basma* and soldering – are known among Achaemenid antiquities from the 6th–4th centuries BC, including the Oxus Treasure,[8] the contents of a rich tomb at Susa[9] and an unprovenanced example in the Shumei collection.[10] Similar bracelets are depicted on a glazed brick frieze of archers from Susa, and the east staircase façade of the Apadana at Persepolis showing members of a delegation from Lydia.[11] The stylistic features and manufacturing method of the hollow figures described above are also found on other types of ancient Near Eastern artefacts, such as the sculptural elements on several rhyta in the Borovo Treasure,[12] the fourth 'Seven Brothers' burial-mound,[13] the zoomorphic handles of a bowl in the Siberian collection of Peter the Great,[14] and winged ibex handles on a silver amphora in the George Ortiz Collection.[15] The central part of the gold diadem from burial mound 3 at Kelermes is decorated with a three-dimensional griffin's head which has a longitudinal solder seam running across it, caused by the cutting of the sheet metal into two in order to remove the matrix after the shaping of the figure.[16] On the other hand, the hollow ram's head pendants on the headpiece do not have cut lines but are made as single pieces.

Objects in the Siberian Collection of Peter the Great

There are several examples of ancient Near Eastern personal ornaments in this collection. A gold plate showing a griffin attacking an ibex was probably part of an aigrette and had been assembled by soldering together different relief plates and a three-dimensional section (Figure 4.1).[17] The bas-relief tail, body of the bird with outstretched wings and figure of the ibex were shaped from metal plates placed on carved substructures and using the *basma* technique, and traces of pressure on the metal are to be found on their obverse sides. The hollow three-dimensional head of the griffin was made separately by shaping metal tubes onto the carved matrix (Figure 4.2). This matrix may have looked like the carved wooden griffin-shaped plates with outstretched wings on the horse bridles found in mound 1 at Ak-Alakha 1, the Ak-Alakha 3 cemetery and the Kuturguntas burial mound.[18] It was removed from the side of the griffin's head, judging by a longitudinal seam at this spot (Figure 4.2–3). The remaining details, such as the plumage, was created with oblique lines and soldered scale-shaped cells, and the recesses and vertical rows of eyelets on the tail were added to the finished object. As has been correctly observed elsewhere, the headpiece is iconographically and stylistically similar to objects from Achaemenid Iran.[19]

Other objects of interest from the Peter the Great Siberian Collection are two high-status gold Achaemenid torcs which could be closed by hooking the terminals together. The terminals of the first torc represent feline predators, while those of the second are in the form of winged lions (Figures 5–7).[20] The construction of the two pieces is identical: both consist of two parts which were soldered together from several details. Their hoops are hollow tubes soldered from rolled thin plates which were then inserted one into together, as evidenced by the longitudinal and latitudinal soldering seams. Despite the similarity of the terminals, the figures were created in symmetrically identical orientations on individual carved matrixes using the *basma* technique (Figures 6.1, 8.1). Seams of various origins are visible on the sculptural elements of the two torcs. On the torc with the feline predators, a straight longitudinal seam runs from the backs of the animals to the smooth part of the tube (Figure 6.2). It was made at the stage of the formation of the conical hollow blank, when the edges of the plate were rolled over and soldered together. A carved sculptured matrix was then inserted within and the relief pressed into the metal. A second large ladder-like seam commences on the bellies of the animals and continues onto the tube, and was formed when the metal sheet was cut in order to remove the matrix. The irregular edge of the seam is associated with widening the cut in order to remove the high-relief core. The seams on the winged lions on the second torc are placed in a similar fashion, only here the straight seam is on the belly while the ladder-shaped one is on the back (Figure 8.2). On this torc, hollow horned lion heads with complex relief and numerous small details were attached to the feline predators. They are different and were made using the

[8] Dalton 1964: 32–34, cat. 116, pl. I; Curtis and Tallis eds 2005: 138–39, cat. 153 (BM inv. nr. 124017).
[9] Tallon 1992; Curtis and Tallis eds 2005: 174–79.
[10] O'Neill ed. 1996: 50–51, 59.
[11] Ghirshman 1964: 141, 174, 179.
[12] Marazov, Zhuravlev and Firsov eds 2013: 136.
[13] Minasyan 2014: 315.
[14] Piotrovsky, Adamova and Nikitin eds 2004: 36; see also Mongiatti and Korolkova, this volume.
[15] Ortiz 1993: cat. 205.
[16] Minasyan 2010: 190.
[17] Piotrovsky, Adamova and Nikitin eds 2004: 48–49; see also Korolkova, this volume, Mongiatti and Korolkova, this volume.
[18] Polosmak 2001: 49–52, 82–85, 104–105.
[19] Piotrovsky, Adamova and Nikitin eds 2004: 49.
[20] Piotrovsky, Adamova and Nikitin eds 2004: 29, 37.

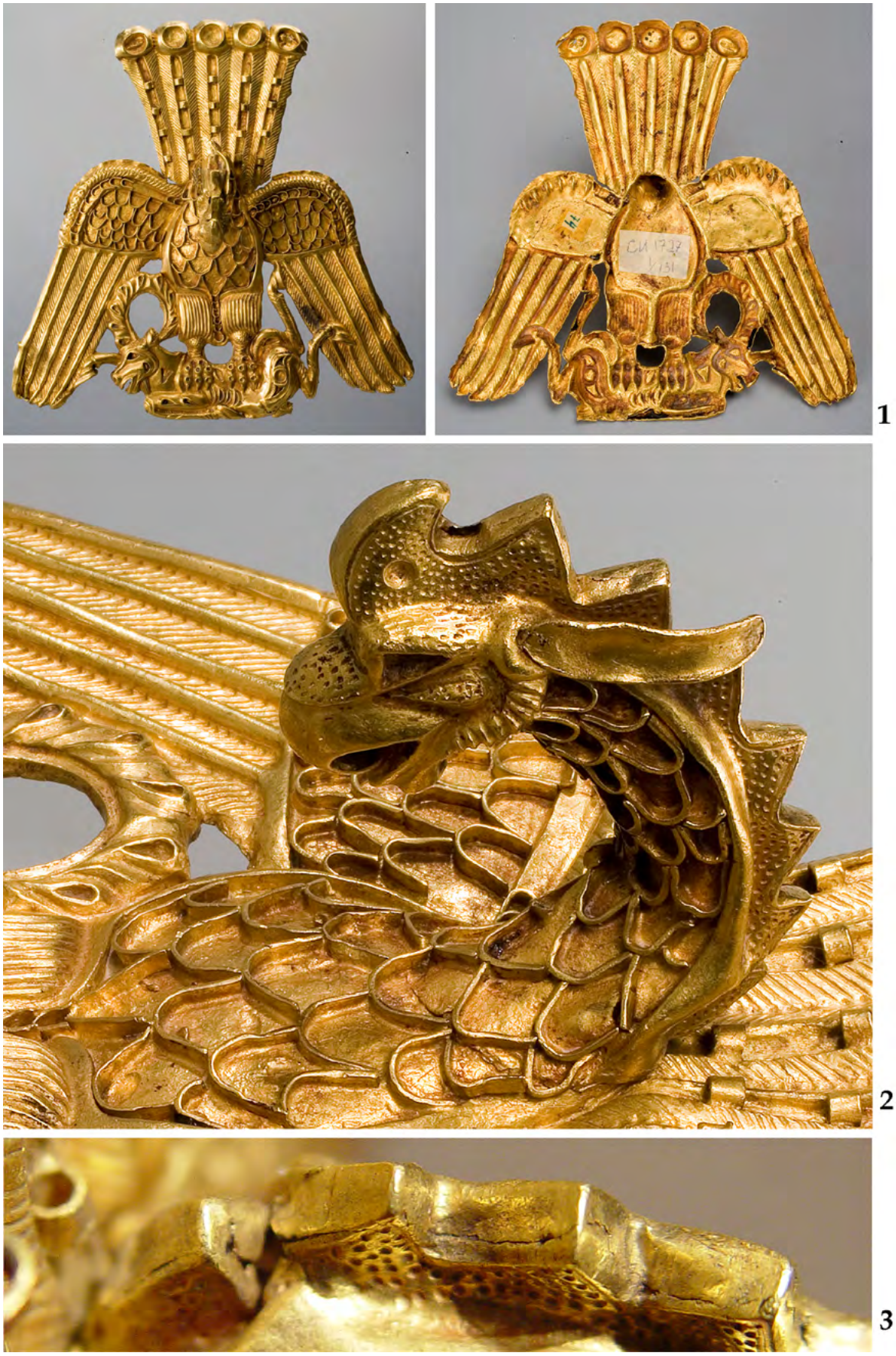

Figure 4. Gold aigrette from Peter the Great's Siberian Collection: 1, obverse and reverse; 2–3, hollow griffin head with a longitudinal seam along the crest, 4th–3rd century BC (State Hermitage Museum, inv. nr. Si 1727 1/131; photographs: V. Terebenin / E. Shablavina)

Figure 5. Gold spiral torc with zoomorphic terminals and solder seams on the surface of the folded hollow hoops and at the junctions between the terminals and the hoops: Siberian Collection of Peter the Great, *basma* technique, soldered, 4th–3rd century BC (State Hermitage Museum, inv. nr. Si 1727 1/62; photographs: V. Terebenin / E. Shablavina)

basma technique with individual matrices, which were most probably burnt after production of the cover since there are no seams from cutting on the surface of the shell. The horns were made separately and soldered to the animals' heads.

We know of complete sculptured hollow covers formed on individual matrices. One example is another gold torc in the Siberian Collection of Peter the Great. This has thin-walled terminals in the shape of the head of a feline predator which were filled with a ductile material inserted through manufacturing holes after being soldered to the ends of the wire.[21] Like the Taksai-1 bracelets, all of these items are typical examples of ancient Near Eastern craftsmanship.

[21] Minasyan 2014: 407, 409.

Armlets in the Oxus Treasure and Shumei Collection

The well-known pair of Achaemenid armlets in the Oxus Treasure are structurally and stylistically the closest to the winged lion torc from the Siberian Collection of Peter the Great.[22] The omega-shaped hoops are decorated with hollow terminals in the form of horned griffins. In a contribution to an exhibition catalogue, Dr Barbara Armbruster concluded that the hollow details of these ornaments were made by lost-wax casting and that their obverse surface was then chased with punches, chisels and a hammer on a clay core, which remained inside the cast during this stage.[23] However, technical data obtained from examination of similar Achaemenid artefacts suggests that this conclusion is incorrect and that the tooling traces were incorrectly interpreted. If these items had indeed been made in this way, the inner side of the thin-walled figures would bear the typical signs of casting which could not be fully cleaned mechanically because of their internal structure: one can easily verify this by examining the inner surface of the objects through the holes in the body of the bracelets. However, we can confidently assert that there are no signs of casting on the inner walls of the sculptural terminals because these parts were made by another technique, i.e. by shaping thin metal plates onto high-relief matrixes, as in the cases mentioned above. The traces of scraping and smoothing interpreted by Dr Armbruster as traces of manipulation of the surface of the wax model are in fact the marks left by the sticks used to smooth or beat the sheet metal onto the relief matrix. Unfortunately, the accompanying photographs and descriptions in her contribution do not indicate whether the terminals are identical or illustrate the position of the seams. This information, which is important for determining the structural features of the objects and the way they were assembled, should certainly be verified in future.[24]

[22] Dalton 1964: 32–34, cat. 116, pl. I; Curtis and Tallis eds 2005: 138–39, cat. 153 (British Museum inv. nr. 124017, Victoria and Albert Museum, inv. nr. 442-1884).

[23] Armbruster 2005.

[24] [EDS: This is already programmed as part of a comprehensive programme of scientific and curatorial research being undertaken at the British Museum by Dr A. Mongiatti and Dr St J. Simpson].

Figure 6. Details of the gold spiral torc with zoomorphic terminals: 1, individual figures of the terminals; 2, the straight longitudinal seam on the animal's back of the folded hollow conical metal piece and the seam on the belly from cutting the cover (State Hermitage Museum, inv. nr. Si 1727 1/62; photographs: V. Terebenin / E. Shablavina)

There is a similar pair of omega-shaped armlets with sculptured hollow terminals in the form of winged ibexes and hollow hoops in the Shumei collection. In the published description it is stated that the hollow details were made by casting.[25] However, judging by the photographs, there are gaps in the metal on the surface of the sculptural figures which is seen here as evidence instead of a different method of forming the figures from thin gold sheet. This supposition also requires verification.

Evidence for lost-wax casting

In addition to the *basma* technique described here, lost-wax casting was also used by Achaemenid metalworkers to render hollow details or decoration. A silver amphora found in the male burial in Mound 4 at Filippovka-1 resembles one shown carried by a Lydian delegation on the eastern staircase of the Apadana at Persepolis.[26] The excavated amphora has a tall smooth neck, a grooved body decorated with vertical flutes, and a three-dimensional handle-spout in the form of a winged ibex, although the second handle is missing (Figure 9). The base of the vessel neck is decorated with a rib bearing a horizontal row of tongue patterns. The amphora was made from a forged blank cast in the shape of a tumbler, judging by the uneven thickness of the vessel walls, and the thickness of the rim was roughly equal to that of the metal of the blank. The inner surface of the amphora is covered in dents, all traces of the shaping of the cast blank. A wooden matrix in the shape of the vessel with carved flutes was inserted into the blank and metal pressed onto it from above. An ornamental band of oblong tongue patterns was embossed around the base of the neck. The profile of this border in the form of a relief cylinder was pressed out, then worked and levelled on a lathe, along with the neck and the flanged rim. Traces of this work are evidenced in the concentric lines on the sides of the amphora, the relief border and a small centering spot on the underside where it was attached to a lathe. After the final modelling of the amphora shape the matrix was burnt. The final amphora without handles resembles a Lydian silver vessel from Ikiztepe in the Uşak Museum.[27] This method of shaping vessels – the *basma* technique – was widely used in antiquity for making other types of vessels, including rhyta.[28]

The sculpted hollow handle with a spout in the form of a winged ibex was cast from a carved lost-wax model: the corrosion of the silver on the spout has a cast dendritic structure (Figure 9.2, 4).[29] In order to make the cavity in the handle, a wax model was moulded on a curved figured clay core with a projection on one side to form the spout which was an internal part of the closed mould. The body and details of the animal were carved like a sculpture, and are typical of Achaemenid art. Evidence for this is the clear

[25] O'Neill ed. 1996: 51, 185.

[26] Yablonsky ed. 2008: 90; Treister and Yablonsky eds 2012: 109–10, 352; Ghirshman 1964: 174, 179; Simpson 2005: 106, fig. 46.

[27] Özgen and Öztürk 1996: nos 65–66.

[28] Minasyan in press.

[29] Treister and Yablonsky eds 2012: 109.

Figure 7. Gold spiral torc with winged lion terminals and solder seams on the surface of the folded hollow hoops and at the junctions of the terminals and hoops: Siberian Collection of Peter the Great, *basma* technique, soldered, 5th–4th century BC (State Hermitage Museum, inv. nr. Z-568; photographs: V. Terebenin / E. Shablavina)

forms of the animals, head, neck, body and legs. The head was probably originally crowned with horns modelled in wax, which were subsequently lost in antiquity. There is an oval spot on the cast handle below the chest of the ibex. This is a soldered silver patch which covers the technological hole formed during the construction of the casting mould (Figure 9.3). At the modelling stage a technological hole was cut on the location of the patch in the wax down to the clay core: this facilitated the firm fixing of the inner and outer parts of the clay mould after the burning of the wax model and the formation of the cast cavity. There is a second hole for this purpose on the spout on the vessel's handle.

Judging by pictures and similar vessels, the missing second handle was symmetrical, also made in the shape of a winged goat, and formed on an individual wax model moulded on a clay core. Both handles were cast in separate closed moulds. However, there are no casting seams on the surviving handle. The cast surface is clearly visible on the animal's damaged head and the cleaned parts of its body. The handles were soldered onto the amphora in two places: on the edge of the rim and on the body of the vessel. A small triangular hole was cut out of the body before the handle was attached so that the contents could pour easily through the spout.

There are silver vessels with similar handles in other museums and private collections, but their provenance is unknown.[30] On some the hollow handles were cast, whereas others were made from silver sheet. It is said that the handles of an amphora in the Ortiz collection were made in two halves by repoussé technique.[31] However, it is more likely that these details were also made using the *basma* technique: the hollow piece was not made of separate halves but formed whole from a hollow blank on a matrix which was cut into two for the extraction of the matrix, as interpreted above for other Achaemenid examples.

Artefacts with solid cast sculptured details are encountered among other documented finds of Achaemenid type. These include gold torcs and the silver hilt of a knife excavated in the cemetery at Filippovka-I.[32] Other objects include a pair of women's gold omega-shaped bracelets from burial 4 in mound 4 at the same site, which have stylistic features resembling those of Achaemenid art as well as structural characteristics typical of the *basma* technique (Figure 10). The ends of the thick hoops, which are equal in diameter along their entire circumference, are decorated with ibex figures: unlike the gold torcs from this site where the high-relief cast terminals were soldered onto the ends of the wire, these bracelets and their figured terminals were cast

[30] Ghirshman 1964: 254, 271, figs 307, 333; Ortiz 1993: cat. 205; Sideris 2016: 19–22, 176–77.
[31] https://www.georgeortiz.com/objects/achaemenid/205-amphora/ [accessed 9th October 2018]
[32] Treister and Yablonsky eds 2012: 99, 104–105, 114–15, 124, figs 67, 73.2, 82, 90.6.

Figure 8. Details of the gold spiral torc with winged lion terminals: 1, individual figures of the terminals; 2, the straight longitudinal seam on the animal's belly back of the folded hollow conical metal piece and the seam along the back from cutting the cover (State Hermitage Museum, inv. nr. Z-568; photographs: V. Terebenin / E. Shablavina)

as one from wax models.[33] In order to ensure that all the details were cast, the wax horns were bent into the ring during the moulding of the model and the ends joined to the back of the animal's head, and the ends of the ears were joined to the horns. All the sockets for inlays, some of which show remains of paste or enamel, were also modelled in wax. The castings were then mechanically smoothed. The figures of the animals were decorated with an ornamental strip of transverse lines from the chin to the chest, and from the back of the head, along the neck and back to the tail. In the centre of this strip a thin longitudinal line was applied above the decoration, possibly imitating the joining seam on the above-mentioned hollow objects made in the *basma* technique.

Conclusions

A small number of Achaemenid objects, of different materials and functions, have been found at Scythian and Sarmatian sites. They include silver vessels as well as items of personal adornment made of gold. Some of these are discussed in this paper and compared with similar objects found within the territories of the Achaemenid empire. Three methods of manufacture can be identified on the artefacts we have examined: the *basma* technique, hollow casting and solid casting, the latter two using the lost-wax technique. These may be linked with chronological and regional characteristics of the manufacture of items from precious and non-ferrous metals in the Achaemenid empire and neighbouring territories, but that is a subject for further research. Moreover, for a more comprehensive assessment of specific feature Achaemenid metalworking we need more reliable technical information about a larger number of Achaemenid artefacts and compare these with material of Eurasian nomad metalworking of this period.

[33] Treister and Yablonsky eds 2012: 115–16, fig. 83.1–2.

Figure 9. Silver amphora from Filippovka-I, burial mound 4, Grave 4: 1, general view; 2, evidence for lost-wax casting of the zoomorphic handle; 3, soldered patch over the technological hole; 4, scraping at the sides of the horns. Cast and soldered, 5th–4th century BC (Orenburg Regional Historical Museum, inv. nr. 19064; photographs: E. Shablavina)

Figure 10. Pair of gold bracelets made by lost-wax casting, Filippovka-I, mound 4, Grave 4, 5th–4th century BC (Orenburg Regional Historical Museum, inv. nrs 19105–19106; photograph: E. Shablavina)

Jiang Yuan and north Chinese nomads

Daniil P. Shulga[1]

Abstract

In this brief paper we review Zhuge Liang's treatise *Jiang Yuan* (将苑) [*The Vineyard of General*] and other ancient Chinese philosophical schools and war thinkers' concepts of ideal military leaders up to the 3rd century to evaluate their concept of the ideal military leader.

Keywords: Three Kingdoms; *rong*; *di*; Zhuge Liang

The personality of Zhuge Liang in Chinese culture is mythologised, synonymous with wisdom, intelligence and wit, and many ideas, inventions and literary works are attributed to him.[2] This is probably because in real life Zhuge Liang was a successful strategist judging by an analysis of his biography, major battles and the 'Three Kingdoms' era. Thus Zhuge Liang's works should be regarded as the work of an outstanding military theorist and a practical man. The invaluable contribution by the author of *Jiang Yuan*, whom we provisionally correlate with the real Zhuge Liang, is that he was one of the first to describe the features of war with the nomads. Was Zhuge Liang right to deny the *di* statehood? He wrote the following:

> 'Northern *di* do not live a sedentary life, they migrate in search of water and grass, it contributes to their raids to the south. Response campaigns to the north are hampered because of mountain ranges and deserts, which enable the defence. For food they hunt and drink milk; leather fur clothes protect them from cold; they shoot the beast at full gallop, and that's how they pursue the livelihood. It is not possible to instill the moral laws into them; to defeat them with the help of the army is impossible. Han Empire did not fight with them because of three reasons: Han soldiers were also warriors and cultivators, which made them tired and timid. Northern people were coming for grazing and hunting; they were vital and brave. A tired man cannot compete against the cheerful, a shy man is unable to compete against the brave. This is the first reason for not fighting. Han soldiers were hardy, they could go a hundred *li* per day, but northern people used horses, which allowed them to overcome the distance several times faster. During the north campaigns the Han army had to carry provisions and equipment with them; the nomads chased them on horseback, so there were different ways of moving, the way for the troops passage was often wrong etc. This is the second reason for not fighting. Han Empire was based on infantry mainly, and northern people on the cavalry; in open space a cavalry soldier goes faster than foot, and there is a big speed difference between them. This is the third reason for not fighting. In consideration of this situation, there is a list of tips to protect the borders. The best soldiers and commanders should be sent to protect the borders, at the same time elite troops must be ready to defend. You need to create an extensive provisions warehouses network, to build a signal towers system to learn about the enemy's movements. When the internal enemy territories are empty, you need to concentrate the troops, and attack using the enemy troop's absence. This way you can defeat the enemy at low cost without starting a large-scale campaign to frustrate the enemy's plans'.[3]

The presence of some nomadic people in the Han period, which corresponds in Russian historiography to the Hun-Sarmatian period, within the territories of southern Siberia and China is recognised by many researchers. Many domestic and foreign studies are dedicated to the analysis of this information. Funerary memorial constructions required much labour costs, such as the Arzhan-1 and Arzhan-2 burial mounds of the 8th and 7th centuries BC respectively in Tuva,[4] the Salbyk kurgan of the 4th and 3rd centuries BC in Khakassia,[5] Pazyryk,[6] the Kamenskaya archaeological cultures and Saka kurgans in Altai and Kazakhstan,[7] denote a high level of society consolidation. Elements of nomadic culture were successfully introduced into

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[2] Zhuge Liang 2008.

[3] Zhuge Liang 2008: 142.

[4] Gryaznov 1980; Chugunov, Parzinger and Nagler *et al.* 2010.

[5] Marsadolov 2010.

[6] Rudenko 1960.

[7] Shulga 2013*c*.

Eastern Zhou art in China between the 8th and 3rd centuries BC. There are some 'royal' tumuli in the northern part of Xinjiang (China) but they have not been excavated.

All of this enabled some researchers to raise the question of proto-state or chiefdom formation in these areas. This point of view was the most fully expressed by A.I. Martynov who substantiated the concept of a pastoral civilisation. According to his opinion, during the 8th to 7th centuries BC there were considerable changes in the nomadic environment which led, during the 6th and 5th centuries BC, to the appearance of 'Scythians and Saks States in the Altai mountains, in the zone of Tagar culture spreading and in Ordos which existed not more than 300–350 years'. Opponents of this point of view adduce the lack of exact directions in narrative sources as a counter-argument.

The current state of knowledge allows us to state that many of the so-called 'barbarian' people on the northern borders of ancient China were proto-state formations, if not states in their own right, and such formations most likely existed in southern Siberia too. However, it must be stressed that the Siberian pastoral societies were unstable because of the specifics of their economy and harsh climate.[8] Apparently, these 'states' formed occasionally and only lasted a few decades.[9] During these periods the communication and trade became more intense. The floruit was in the 3rd century BC, judging by the considerable number of 'royal' and 'princely' tumuli found not only in the Altai mountains but also in the plains, such as the Bugry cemetery excavated by K.V. Chugunov. These tombs include many imports from China, central Asia, Near East and India, including lacquer bowls, mirrors and other items. However, such imports also occur in ordinary Kamenskaya culture burials.[10]

During the 5th to 3rd centuries BC, judging by finds from the Novotroitsk and Bystrovka cemeteries, the population was living in stable conditions and engaged in the fur trade. The Zhongshan kingdom long before the birth of Zhuge Liang became a unique example of state construction by *di* 'barbarians' described by the general. Zhongshan was a state based by the 'white *di*' *xianyu* clan in the final stage of the Chunqiu period (722–481 BC). This state formation history is long and sometimes confusing. It existed almost from the beginning to the end of the 'Warring States' period (481–221 BC). The process of economic development was often accompanied by a shift from pastoralism to agriculture and settled crafts. The memory of the non-Chinese origin of the Zhongshan kingdom had been maintained by its neighbours for a long period. 'The relationship with barbarians' was a cause for reproach for a humble origin, and one which is typical of Chinese tradition in general.

Thus, in the mid-1st millennium BC we can observe the nomad's statehood unstable forms, when the same people formed completely different by form and content kingdoms and empires in different areas. Although the information about northern nomads contained in *Jiang yuan* is a little biased, it is unique in content and completely verifiable in terms of economic structure. If the talk about 'northern tribes' comes down primarily to nomadic communities, the western territories are presented in their descriptions as fully or partly agricultural. It is interesting that Zhuge Liang does not advise fighting them, as it does against other foreigners: 'Accustomed to the constant war *rong* do not give up, they have a rebellious heart, so we have to wait until they are exposed to external incursion, it is better to deal with them in days of their internal contradictions'.

Based on the analysis of different sources, we can certainly adduce an agricultural component among the Xinjiang population since at least the early Iron Age. Despite the fact that Zhuge Liang combined a number of different cultural and economic groups in his term 'Western *rong*', from the 6th century BC we can see real and significant differences between the Western Region ('Rong' area) on the one hand, and Inner Mongolia, Gansu, Ningxia Hui Autonomous Region (*di* area) on the other. It is significant that the line between 'western' and 'northern' communities ran around the modern Xinjiang and Gansu border, and corresponds with the natural climatic zones of western deserts and semi-deserts on the one part, and northern steppes and grassy valleys on the other.

The historical Zhuge Liang actively participated in attempts to unify the northern tribes against Wei and certainly knew about the manners and lifestyle of northern China's neighbours. His messages are closely supported by the archaeological evidence. At the same time, interest in the 'barbarians' was purely political, rather than cultural, and he therefore used the unspecific and highly generalised terms *rong* and *di*, which had been used by Chinese since the Zhou era. Nevertheless, *Jiang yuan* contains a wealth of diverse information which provides an excellent basis for research for linguistics, oriental studies, philosophy and archaeology.

[8] Teng Minyu 2010: 242–43.
[9] Yang Jianhua 2004: 124–27.
[10] Shulga 2013*c*.

Mysterious transformations of the Scythian cultures in the 6th and 3rd centuries BC

P. I. Shulga[1]

Abstract

In the history of Scythian cultures, there are three periods of major change: their genesis in the 8th and 7th centuries BC, a sudden change of the cultural appearance in the 6th century BC, and the disappearance or significant transformation in the 3rd century BC. The processes of cultural genesis in the 8th and 7th centuries BC differed significantly, whereas in the 6th and 3rd centuries BC they were strikingly similar. This work is devoted to these two mysterious 'dark' periods in the history of Scythian cultures. There were apparently a whole range of reasons for these changes, among which migration and climate change were not the main ones. We emphasise that in each region the Scythian cultures of the 5th to 3rd centuries BC differed significantly among themselves which indicates the importance of the contribution of the local population in the formation of a particular culture. In addition, in our opinion, other unknown factors of a higher level influenced the agricultural civilisations which were in contact with these herders. Indeed, in the 6th and the second half of the 4th and 3rd centuries BC there were important changes in the spiritual and material culture in the states of Greece, the Near East and China who were synchronous with nomadic environment.

Keywords: Scythian world; Scythoid cultures; Xiongnu; Maoqinggou culture; Eurasian steppe belt; Black Sea coast; northern China; periods; chronology; migrations

During the 8th to 3rd centuries BC, the huge space stretching about 7000 km from the Danube in the west and almost to the Pacific ocean in the east was inhabited by tribes with a culture of Scythian appearance. They were engaged mainly in animal breeding and therefore roamed with their herds across the 'great steppe' belt and adjacent forest-steppe and semi-desert landscapes to the north and south respectively. The western and central parts of the Scythian world were inhabited by Caucasoid people whereas Mongoloids lived in the easternmost territories corresponding to present-day eastern Mongolia and northern China. Despite the huge distances, specificity of the economy, significant ethnic and even racial differences, they were characterised by similar religious beliefs and burial rites, as well as the famous 'Scythian triad' which included the 'Animal Style', armament and horse equipment.

During the history of Scythian cultures there are three periods of major change, namely their genesis during the 8th and 7th centuries BC, a sudden change of the cultural appearance in the sixth century BC, and the disappearance or significant transformation during the 3rd century BC. The processes of cultural genesis in the 8th and 7th centuries BC differed significantly, whereas in the 6th and 3rd centuries BC they were strikingly similar. This paper examines these two mysterious 'dark' periods in the history of Scythian cultures.

Over the course of archaeological study of Scythia proper in the northern Black Sea coastal region, researchers have drawn attention to the fact that burials of the 6th century BC are very rare there and the so-called 'medium-scale Scythian culture' (MSSC) is formed around the turn of the 6th and 5th centuries BC.[2] At the middle of this period, during the second half of the 4th century BC, MSSC reaches its apogee judging by the large number of burials of this period and which include elite burial mounds.[3] At the beginning of the 3rd century BC Scythian culture in the Black Sea region disappeared, only surviving on the peninsula in the Crimea.[4]

The study of Scythian period sites in the southern Urals and further east has been less intensive, the materials obtained are more vaguely dated, and it has therefore been difficult to develop a chronological scheme of development or understand the basic processes occurring during the 6th to 3rd centuries BC. However, in recent decades the amount of materials in the east has increased significantly, particularly from China which for a long time has been a blank on the map of the Scythian world. It now transpires that during the early 6th century BC across the territory of southern Siberia, Kazakhstan and China the previously flourishing cultures of the early Scythian period suddenly disappear, either completely in Kazakhstan, the Upper

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[2] Alekseev 2003*a*: 154–58; Grechko 2012.
[3] Alekseev 2003*a*: 239; Koltukhov 2012: 60.
[4] Dashevskaya 1991.

Ob region, Altai and Tuva, or almost completely in the case of Xinjiang and northern China. Across the eastern Scythian world, just as in the west, there then follows a 'dark' period during the mid-6th century BC with barely any burials. The exception is the unique grave field of Yuhuangmiao, near the city of Beijing, which dates to the second half of the 7th and 6th centuries BC.[5] From the end of the 6th to the beginning of the 5th century BC in the southern Urals, southern Siberia and China new cultures developed, each with their own particular burial rites and grave goods. As in Scythia, many of these flourished during the second half of the 4th century BC but at the beginning of the third century BC, or in the Altai mountains after about 270 BC, these cultures also disappeared.

It is evident that from the 6th to the 3rd centuries BC major cultural changes occurred across the entire Scythian world. It is usually believed that the reasons for these changes were population migration and/or climate change. Such an explanation might look quite acceptable for individual regions, for example the northern Black Sea coast or the Altai mountains, but it is much more complicated when one considers the population over such a vast territory. The fact is that almost all the new cultures which appeared in the steppe belt of Eurasia during the second half of the 6th and the beginning of the 5th centuries BC fundamentally differ from their predecessors, judging by their burial rites, grave goods, art, armament and the equipment of the warrior and horse. All this appears as if from nowhere since the original territories of these cultures and innovations are generally not established: indeed where could the hordes of nomads with other beliefs and art, more sophisticated weapons and horse equipment, have come which simultaneously occupied the steppes from Danube to Manchuria (China)? The same can be said about the environmental factors which are not uniform across this huge territory.

There instead appear to have been a whole variety of reasons, among which migration and climate change were not the principal causes. We emphasise that in each region the Scythian cultures of the 5th to 3rd centuries BC differed significantly between themselves which indicates the importance of the contribution of the local population in the formation of any particular culture. In addition, in our opinion, factors of a higher level which we do not yet understand influenced the agricultural civilisations which were in contact with the herders. Indeed, in the 6th and the second half of the 4th to 3rd centuries BC, there were important changes in the spiritual and material culture in the states of Greece, Near East and China and synchronous with their nomadic neighbours to the north.

The mechanisms by which archaeological cultures developed are generally unknown. However, in the eastern end of the Scythian world in northern China, in the area of lake Daihai to the northwest of Ordos, there is a Scythian culture known as Maoqinggou. Using this as an example, one can trace the actual processes which took place in the 'dark' periods of its formation during the 6th and 5th centuries BC, and its disappearance during the 4th to 3rd centuries BC. This culture is special owing to its location near the region later occupied by the Xiongnu, as well as the clear evidence for its genesis.[6] During the process of the formation and development of the Maoqinggou culture over five centuries, all major groups of the population from Gansu and the Yellow River to Mongolia took part: the population of Manchuria and Mongolia in the 8th century BC, the inhabitants of the Yan kingdom in the 6th century BC and the Yanglang and Shajing cultures, 'Chinese' farmers from the south, in the 5th and 4th centuries BC. At the same time there was constant invasion by nomads from the north. It is important to note that the formation of Maoqinggou culture in the area of lake Daihai occurs at the end of the 'Spring and Autumn' period and at the beginning of the 'Warring States' period when noticeable changes occur within these states in China. During the 3rd century BC the Maoqinggou culture disappears and its territory is occupied by a nomadic community headed by the Xiongnu. On this basis the culture of Maoqinggou is associated with the early Xiongnu by Chinese and some foreign researchers. Indeed there are no other sites of the early Xiongnu in the area of Ordos and lake Daihai and are unlikely to be discovered. According to numerous written sources the powerful state of Xiongnu emerged on this territory in the 3rd century BC but they cannot be detected archaeologically at this early date. The 3rd century BC thus is a 'dark' period for the history of two archaeological cultures, the Maoqinggou and the Xiongnu, located in the same territory. The archaeologically defined culture of the Xiongnu is later and formed with the participation of numerous nomadic tribes, many under the noticeable influence of Chinese culture, and even included a Chinese population.

It should be added that the 3rd century BC proved to be a turning point, not only for the nomads of northern China but also for the agricultural kingdoms of China. By 221 BC, the kingdom of Qin during the course of brutal wars united China and, within the shortest period of time, a noticeable change in the cultural appearance took place with the unification of all aspects of life, from chariots and armament to writing and ideology. At the same time the physical destruction and assimilation of the surviving nomadic Scythoid cultures took place. Six years later, in 215 BC, Qin Shihuandi's troops

[5] Beijing Shi Wenwu Yanjiusuo 2007; Shulga 2013*b*; 2015*b*.

[6] Shulga, Shulga and Girchenko 2014.

drove the nomads out of Ordos, where the previous population left a diverse group of sites belonging to the Taohongbala culture, and pushed them from the Yellow River and wooded mountains into the semi-desert. It is likely that during the second half of the 3rd century BC, under the pressure of Qin, the culture represented by the remarkable elite burial ground of Majiayuan also disappeared.[7] From all this it follows that the Scythian cultures on the borders of China were being transformed, destroyed or assimilated during the century from the end of the 4th to the end of the 3rd century BC, either through internal reasons or under the pressure of the kingdoms of Zhao, Qin and then unified China.

[7] Wang Hui 2009; Gansu Sheng Wenwu Kaogu Yanjiusuo ed. 2014.

Etched or bleached? Traded or copied? Comments on the dating and distribution of a distinctive type of decorated carnelian bead found from India to Eurasia from the early 1st millennium BC to the early medieval period

St John Simpson[1]

Abstract

This paper examines evidence for a highly distinctive class of decorated bead first made in the Indus region in the mid-3rd millennium BC, and this form of decoration continued to be applied to ring stones (although not beads) as late as the 1930s in Sind. For most of the past century these have been referred to as 'etched beads', but more recent studies suggest this is an inappropriate term and they should instead be described as bleached beads. The decoration was made by drawing designs in an alkaline paste on the surface of the carnelian and, when heated, the painted areas turned white whereas the rest of the stone turned red or pinkish orange. Many different motifs were applied to beads of this type. A basic and pioneering classification was published by Horace Beck in 1933 which divided them into three main chronological groups. Since then, most attention has been paid to the distribution and more precise dating of the earliest and latest types, whereas little attention has focused on such beads of the intervening period considered to date between 300 BC and AD 100. There have been a growing number of finds of this middle group (Beck's so-called Type B) and the publication of the finds from the 7th century BC site of Arzhan-2 in southern Siberia helps close this gap with the earlier tradition by another four centuries. A selection of these particular beads was loaned for the BP exhibition *Scythians: warriors of ancient Siberia* and prompted this preliminary literature review. Moreover, this paper includes illustrations of new types not listed by Beck and an updated discussion of the evidence for the development and diffusion of these beads. It concludes that we should now abandon Beck's outdated typology, and introduce better documentation and new scientific techniques in the study of these beads if we are to explore in greater detail the emerging questions as to how and where they were made.

Keywords: Bleached carnelian beads; technology transfer; India; Eurasia; Caucasus; Scythian; Sasanian

Introduction

Etched – henceforth described as bleached – carnelian beads are usually orange, pink or dark reddish in appearance with white lines of decoration on the surface. A much smaller number are completely white and decorated with black designs,[2] and exceptional beads are reddish with black designs.[3] They were first recorded archaeologically in Sind in 1856 following the discoveries by A.F. Bellasis at the early medieval city-site of Brahminabad (al-Mansurah) where the other finds date to about the 8th and 9th centuries:

> 'Among the curiosities found at Brahminabad, showing an advanced state of art, are some beautiful engraving on cornelians and agates. Many of them are perfect gems of art, and, like the intaglios of Rome, are polished on the inside of the device, – an art, I believe, now lost. Some that were found had upon them a bull, and others a lion; some merely a name in Arabic, and some in characters resembling the Devanāgri or Sanskrit; most of these appeared cut in ovals and circles, and would be well suited for the purpose of a signet ring; others were ready cut into these shapes, but without any inscription or device, as if the engraver kept an assortment for the choice of his customers, who had only to express their wish – what device, what name – and the hand of the cunning artist was prepared to make any engraving ordered'.[4]

A selection of these finds was illustrated and include spheres, barrels, bicones and oblates decorated with a variety of wavy and straight lines, open circles and compartmented designs.[5] These intrigued Bellasis who later wrote

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[2] Beck 1933; Beck replicated this effect by using copper, cobalt and manganese: 'The cobalt is the easiest, but I think that the copper gives the closest resemblance. Manganese, unless very thickly done, has a rather purple appearance' (Beck, pers. comm., quoted in Mackay 1943: 200), leading Mackay's wife to remark that 'on one of the beads from Chanhu-daro the black lines have a definitely purplish tint' (Mackay 1944: 203).

[3] During Caspers 1972: 85; Reade 1979: 5. Kenoyer observes that the effect on this last group was accidental rather than deliberate, and argues that all should be referred to as bleached rather than etched beads (Kenoyer 2020); see also the recent replication work and analyses reported in this volume by Holé, Mongiatti and Simpson.

[4] Bellasis 1856. A small and generally representative selection of the finds was presented by A.F. Bellasis to the British Museum in 1857: this is registered in the Department of Asia as the 1857,1118 collection and includes some of the bead-working debris.

[5] Cousens 1975: pl. XIII.

> 'Respecting the cornelian ornaments found figured with patterns in white lines, I have made further enquiry: and while at Sehwan, in upper Sind, an old city famed for cornelian engravers, I found some stones figured in exactly a similar manner. On examination it was ascertained that the chief ingredients used were potash, whitelead, and the juice of the *Kirar* bush (*Capparis aphylla*), made into a thick liquid, and applied with a pen on the cornelian, which, on being exposed to red heat in charcoal, rendered the device indelible'.[6]

During the 1920s and 1930s much earlier versions were excavated in mid-3rd millennium BC contexts in southern Iraq at the Early Dynastic cities of Ur and Kish, and were simultaneously recognised from contemporary contexts at the Harappan cities of Mohenjo-daro and Chanhu-daro in Sind.[7] Since then, the number of Harappan sites where they have been found has grown immensely.[8] Workshops containing beads in various stages of manufacture, rejected cores and flakes, a roasting oven and even a jar packed with finished beads have been excavated at Chanhu-daro and Lothal,[9] and a third located about 200 metres from the main mound at Surkotada was characterised by unworked nodules and wasted fluted cores and blades.[10] Observations made on how bleached seals were still made in Sind gave rise to important insights into the possible ways the ancient examples were decorated.[11]

The largest source of chalcedony, and particularly carnelian, in the Old World are the Ratanpur metamorphic beds of the Deccan Plateau in Bharuch District, southern Gujarat, and the coastal town of Cambay has been the centre of the working of this stone since the 16th century, if not before.[12] Other sources of carnelian occur in northern Gujarat,[13] parts of central and eastern Iran, including the Lut flood plain and Helmand delta,[14] southwest Afghanistan,[15] the Surkandarya district of Uzbekistan,[16] Armenia,[17] Yemen and western Saudi Arabia,[18] near al-Ghail in Ras al-Khaimah[19] and Thailand.[20] Most of these sources were exploited during antiquity for the manufacture of beads, pendants, and occasionally other small items such as seals and ring settings. Arkell gives more details about the bead industry at Cambay.

> 'Veined agate, the most valued Cambay agate, comes from Ranpur in Ahmedabad. When polished, it shows a dark ground with white streaks, or dark veins on a light ground. Its colour is readily intensified by artificial means. It is boiled in oil and then in sulphuric acid to heighten its colour. Red varieties are produced by boiling it in a solution of proto-sulphate of iron, thus very often forming cornelians ... Dr Watt confirms that when collecting pebbles the miners divide them into those of which the colour cannot be improved by burning (i.e. onyx, cat's eye and yellow agate), and those of which it can (all others). The latter are baked to bring out the colour. They are exposed to the sun in the hot season (March and April), and burnt for a day or two under pots in May ... The effect of exposure to sun and fire is to turn light shades of brown to white and dark to chestnut. Maize-coloured stones become rosy-tinted, orange stones become red, and yellow stones become pinkish purple. Cloudy browns and yellows mixed become marked by bands of white and red. The hue of carnelian varies from palest flesh to deepest blood red'.[21]

Ethnoarchaeological research has shown the sequential stages in the manufacture of such beads and how such workshops could have been organised.[22] After gathering the nodules and transporting them to specialised workshops, they were carefully and slowly heated in a reducing atmosphere, such as small pots filled with smouldering sawdust, in order to alter and intensify their colour and dry out the stone. This had the effect of softening the outer cortex which was flaked off and the core reduced as a series of small blades. These were then broken and carefully chipped to make bead rough-outs which were then ground on coarse metamorphic rocks. The ends of the beads were then dotted or roughened in order to prevent the drill bit from slipping; they were then usually drilled from each end in order to reduce the chance of them splitting or shattering around the exit hole of the drill,[23] polished and finally re-heated to restore their colour.

[6] Quoted by Cousens 1975: 55; coloured illustrations by Mrs Rivett Carnac in the *Journal of Indian Art*, vol. 9, p. 5.
[7] Mackay 1929: 185–86; 1931: 459–61; 1943: 199–202, pl. LXXIX.
[8] Prabhakar 2018: 479.
[9] Mackay 1943: 199–214; Rao 1979/85: 118–20, 580–82.
[10] Joshi 1972: 135. Other possible workshops have been reported from Vantavah, Kotada and Kotara (Lahiri 1992: 105).
[11] Mackay 1933; Majumdar 1934: 46–47; most recently reviewed at length by Prabhakar 2018; see also Holé, Mongiatti and Simpson, this volume.
[12] Arkell 1936; Inizan 1999; 2000.
[13] These were closer to the Harappan sites and instrumental neutron activation analyses (INAA) analyses suggest these were used: Law *et al.* 2012.
[14] Savage-Landor 1902: 79; Hakemi 1997: 15; Tosi 1969: 374; cf. also Whitehouse 1975.
[15] Law *et al.* 2012: 180.
[16] This appears to have been the source exploited in the last century for Turkmen and Uzbek silver jewellery and horsegear decoration: cf. Beresneva 1976: 70–99, 101–104.
[17] Brunet 2009.
[18] Inizan, Jazim and Mermier 1992.
[19] Vogt 1996: 112.
[20] Theunissen, Grave and Bailey 2000; but see Carter and Dussubieux 2016 for a more critical view.
[21] Arkell 1936: 302–303.
[22] Mackay 1937; Tosi 1980; Possehl 1981; Karanth 1988; 1992; Roux and Pelegrin 1989; Francis 1991; Kenoyer, Vidale and Bhan 1991: 49–59; 1994; Inizan 1995; 2000; Kenoyer 2007; 2020.
[23] An alternative technique identified at Larsa in southern Iraq involved dotting one side of the bead and then punching the centre of the hollow to produce an equivalent detachment on the opposite

The colour and appearance of these beads were their main attractions but they also had symbolic and amuletic connotations. In his book entitled *Azhar al Afkar fi Djawahir al Ahdjar [Best Thoughts on the Best of Stones]*, the medieval North African author Ahmad ibn Yusuf al-Tifaschi stated of carnelian that 'the best quality is red', and remarked that it is considered an effective amulet or talisman as 'it stills fear during battles', it 'stops hemorrhage from any part of the body, especially in women with long periods', and when 'rubbed against the teeth, it removes their rust and whitens them; it also removes cavities and prevents bleeding of the gums. Calcined cornelian fixes loose teeth and makes them firm'.[24] Within ancient Mesopotamia, as in many other regions, it is clear that conscious decisions were made over the selection of particular colours or materials for representations, seals and possibly even dress, and therefore the selection or preference for particular colours (rather than shapes) of bead must have gained a particular resonance, with further mplications for their status and cost.[25]

It is for this reason that expensive beads were imitated in cheaper materials, and in the Indus region this is a feature of the Harappan period (2600–1900 BC) when there was a much greater variety of materials used than before: long carnelian bicones were replicated as red painted fired clay beads, steatite beads were painted red and white, or incised and inlaid with different colours, glazed composition beads imitated turquoise, lapis, carnelian, shell or white steatite, and high tin copper beads imitated the appearance of gold.[26] It was also during this period that a small proportion of carnelian beads were decorated in imitation of naturally banded agates to create the first examples of what we now call bleached carnelian beads. Significantly, their absolute numbers are low thus, despite large-scale excavations, 'a total of only 41 beads from all cultural contexts from Dholavira is also a clear indication of its rarity, and most probably attesting its status among other bead varieties'.[27]

In 1933 Horace Beck published a seminal article which created a basic typological development of this class of decorated carnelian beads from the 3rd millennium BC to the 10th century AD, defining three major chronological groups which he termed Groups A–C (Figure 1).[28] Since then, attention among Near Eastern and south Asian scholars has mainly focused on the first of these as a diagnostic proxy for trade and a means of synchronising the relative chronologies of cultures in the Indus valley, Persian Gulf and Mesopotamia.[29] These beads are tabular, cylindrical or barrel-shaped, and the designs often involve repeating eye-like, concentric linear or zigzag lines executed with carefully delineated edges on carefully polished beads (Figure 2). After the end of the Indus civilisation in the second quarter of the 3rd millennium BC no further examples are found in the Persian Gulf or Mesopotamia, but this must reflect the collapse of Harappan centres of patronage and long-distance trade, rather than the end of local know-how.

The revival and spread of bleached beads in the 1st millennium BC

> 'Many thousands of such beads have been found in excavations of Greek, Scythic, Parthian, and Kushan sites throughout the north-west of India and in many other sites of Hindustan. They also occur in the pre-historic burials of southern India'.[30]

This observation by one of the giants of Indian archaeology is telling, yet has not attracted the attention it deserved. Until recently, the revival of bleached carnelian bead technology was believed to have occurred around the 3rd century BC. Beck was of the same opinion as Marshall, drawing attention to the fact that bleached beads of this later period were found for the first time beyond India, and that this may have reflected transfer of the technology from the Deccan region to Iran, southern and northern India, and Thailand. This hypothesis is supported by the fact that some varieties are not known at all from the Indian subcontinent.[31] There is also a greater variety of shapes and designs than before, including spherical, barrel, tabular or faceted beads decorated with parallel stripes, wavy lines, zigzags, diamonds, enclosed crosses, dots, radiating lines and compartments. Moreover, the depth of bleaching and quality of the heating varies greatly, suggesting multiple workshops with varying levels of skill.

Over the last few decades, there has been a trickle of new information appearing in the archaeological literature which finally allows us to refine and revise the picture for the later phase of manufacture and circulation of bleached beads. There still remains a

side: Chevalier, Inizan and Tixier 1982. Harappan beads as well as beads made using this technique have been identified, on surface collections made at the ancient, city-site of Girsu (modern Tello) during recent archaeological investigations directed by Dr S. Rey as part of the British Museum Iraq Emergency Heritage Management Training Scheme.

[24] al-Tifaschi, *Arab Roots* 1998: 139; the medieval author also states that 'cornelian is brought from Yemen from mines in 'Aden and Sana'a. It is also brought from Mecca – may God honor her – and cornelian is also brought from the shores of the sea of Ruma [Mediterranean] and from Mecca it is brought to other countries'.

[25] Gorelick and Gwinnett 1990; André-Salvini 1999; Winter 1999.

[26] Kenoyer 2005: 164–65; Law 2011.

[27] Prabhakar 2018: 482.

[28] Beck 1933.

[29] Dikshit 1949; During Caspers 1972; Chakrabati and Moghadam 1977; Reade 1979; Ratnagar 1981; Possehl 1996: 152–58; De Waele and Haerinck 2006.

[30] Sir John Marshall, quoted by Mackay (1929: 185).

[31] Beck 1933; cf. Francis 1999: 52; Glover 1996; Glover and Bellina 2001; 2003; Theunissen, Grave and Bailey 2000.

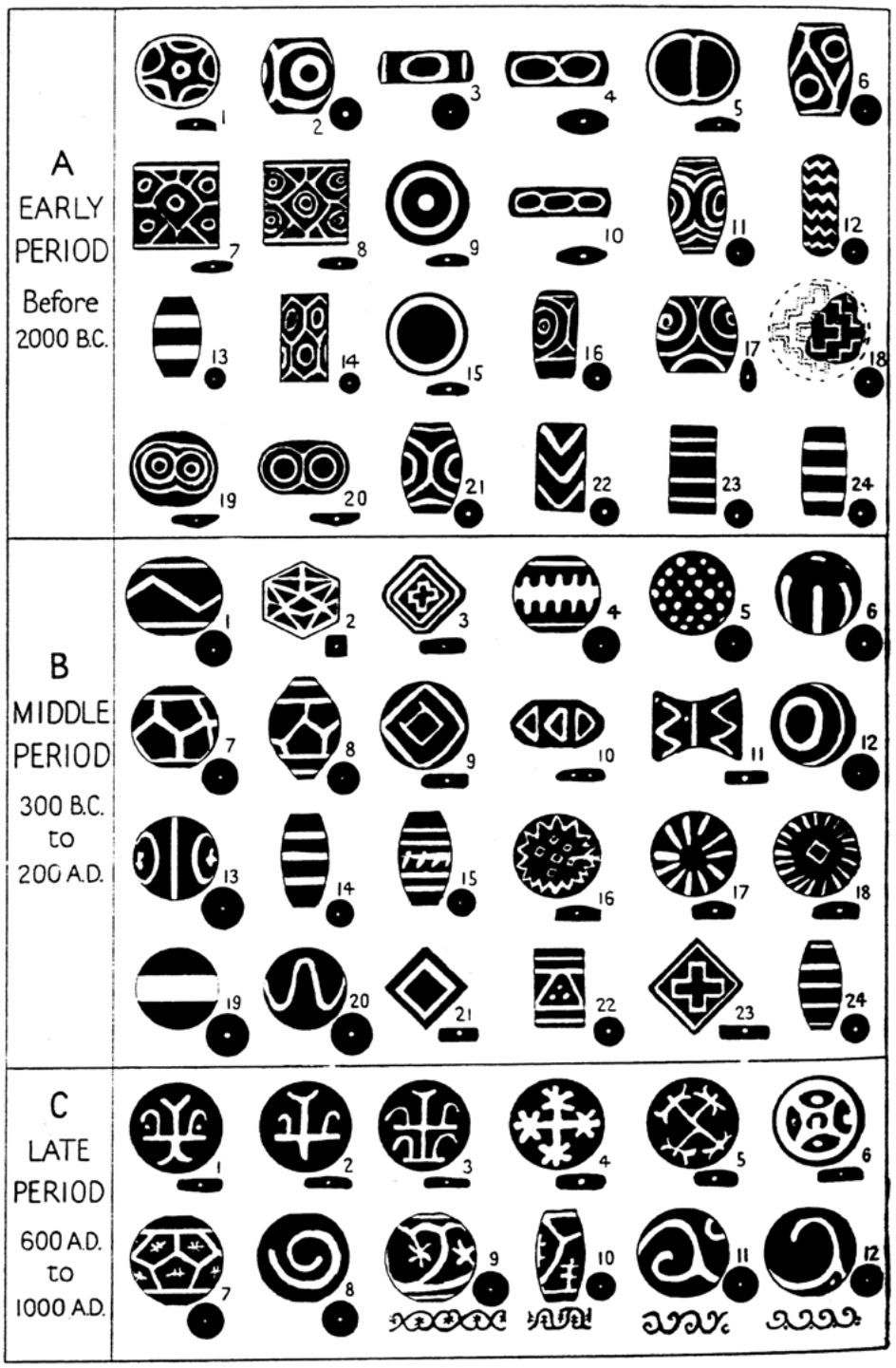

Figure 1. Beck's classification of bleached carnelian beads (after Beck 1933: pl. LXXI)

long gap in the archaeological record between the latest dated examples of the Harappan civilisation and the reappearance of bleached beads, but it is unlikely that the tradition disappeared altogether in India and was then re-invented, either there or somewhere else. In 1974 a short paper by Dr Xia Nai (Zuo Ming) drew attention to a bleached bead found in the Shizhaishan cemetery in Jinning County in Yunnan Province, and its analogies: this was the first time Chinese academics were made aware of these beads being exotic imports.[32]

Many have also been illustrated in Soviet archaeological reports, particularly from central Asia, and/or are displayed in museums in Ashgabat, Dushanbe, and elsewhere, but as far as I am aware only those found in the northern Caucasus have been reviewed in the Russian literature.[33]

Since then, others have been reported from northwest China and in Yunnan and Guangdong,[34] and a small

[32] Zuo Ming 1974.

[33] Kovalevskaya 2001; Chizhova 2004.

[34] Deyun 2014.

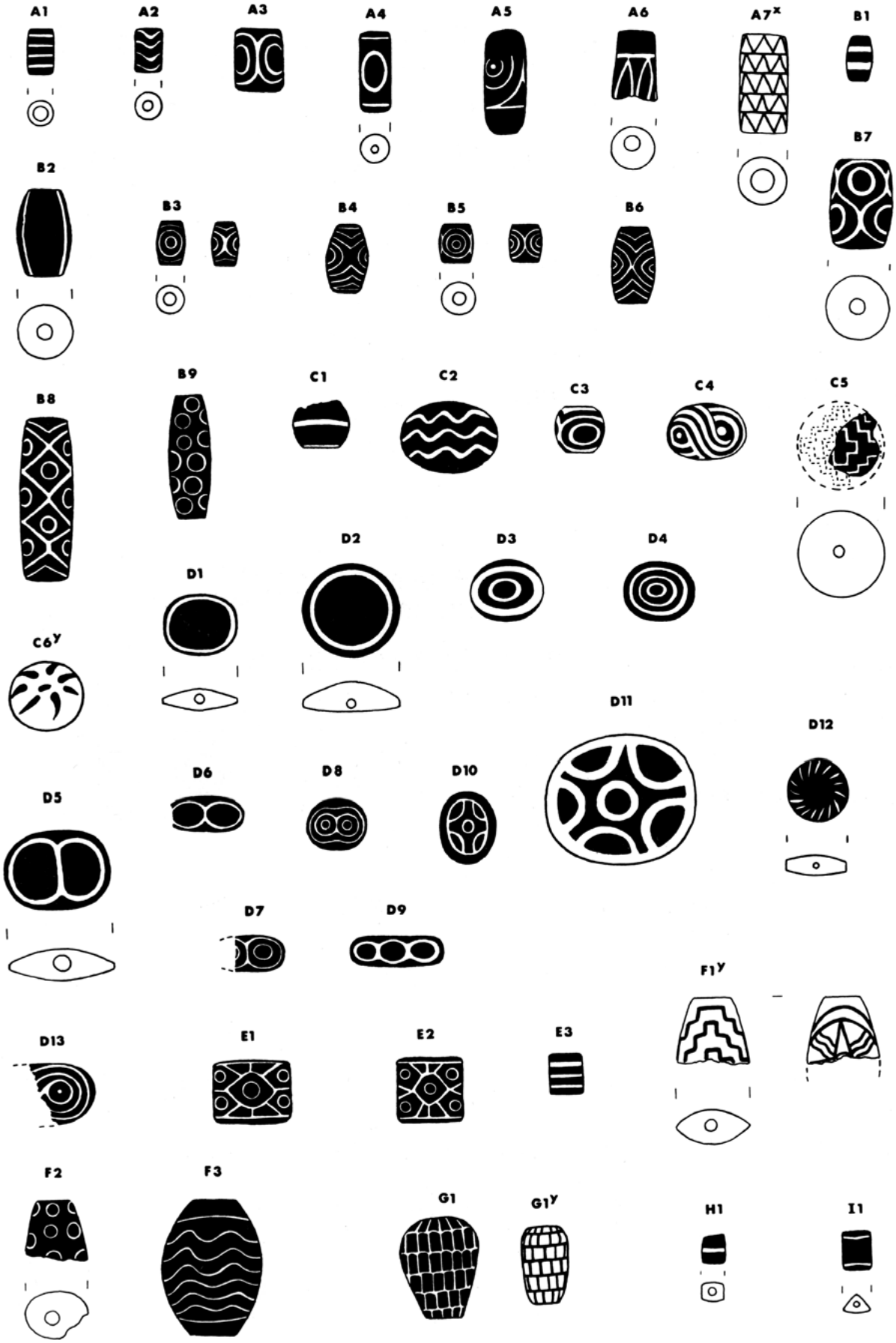

Figure 2. Early bleached carnelian beads
(after Reade 1979: fig. 1)

group published from the unrobbed 7th century BC 'royal' burial at Arzhan-2 in Tuva which was excavated from 2000–2004 by a joint expedition from the State Hermitage Museum and German Archaeological Institute.[35] As some of the latter finds were exhibited in the exhibition which this conference accompanied, this offered an opportunity to review the evidence and propose an updated version of Beck's classification which might assist future researchers. Remarkable because none of the graves had been robbed, the off-centre burial 5 produced spectacular evidence for richly decorated clothing worn by the principal couple, as well as other finds such as a gold-decorated bow-case and a gold-overlay decorated iron battle pick. Beads were present but the impact of the personal appearance was dominated by the colour (and undoubtedly quality) of the clothing and the amount of gold, whether worn as torcs and other high-status symbols or stitched onto their clothing as multiple miniature appliqués (Figure 3). Three of the subsidiary graves contained bleached beads – Graves 12, 13a (skeleton 2) and 13b – and these were situated next to each other, not far from the main tomb chamber. They belonged to an early stage of the use of the funerary monument, and the physical anthropological analyses indicate all the individuals to have been female (Figure 4).[36] Grave 12 contained the body of a 16–19 year old girl (Figure 5); Grave 13 contained three individuals, with an 18–19 year old girl and a 45–50 year old woman buried next to each other in one cist (Figures 6–7), whereas a second cist contained a 20–25 year old female (Figures 8–9).[37] Each was interred with a similar set of grave-goods, including a bronze knife, awl, mirror and a wooden comb; two wore granulated gold earrings, all wore necklaces and some of these were strung from a limited range of material types and forms, as if acquired ready-strung, rather than threaded from *ad hoc* or random beads assembled by the wearer (Figure 10). Photographs of these show how carefully the etching was executed and how the bead blanks themselves were also made rather carefully (Figure 11). The close similarity of finds suggest that they had a shared identity, conceivably because they were closely related. Isotopic analyses of the human remains from Arzhan-2 indicated most belonged to a local population,[38] but a small number of male and female individuals, including one of the women from grave 13b, are now shown to most likely come from the Altai region.[39]

Figure 3. Reconstructed appearance of the female from Grave 5 at Arzhan-2 (reconstruction drawing by D.V. Pozdnyakov)

These finds from Arzhan-2 now provide a chronological anchor for others of the same type known from the art market but which could not be dated closely as they lacked provenance, although it might be added that those from Arzhan-2 are decorated with much greater care (Figure 12). Five others were published in the archaeological literature but do not appear to have received attention. One was illustrated by Beck among the beads from Taxila.[40] Another was illustrated among finds of pottery, beads and broken sections of copper alloy bangles found in a heavily robbed grave at the Khorezmian site of Dingil'dzhe which was dated to the mid-1st millennium BC.[41] A third was found strung on a

[35] Chugunov, Parzinger and Nagler *et al.* 2010. The literature contains two different interpretations over the exact date: tree-ring dating of the logs used in the construction of the main burial chamber suggest a late 7th century date of 608–619 BC but wiggle matching of the tree-rings was argued by Chugunov to indicate an early 7th century date.

[36] The relative dating of these graves within the formation of the overall barrow is discussed in this volume by Chugunov.

[37] Chugunov, Parzinger and Nagler *et al.* 2010: 70–83, pls 88–93, 107–10.

[38] Lokhov *et al.* 2007.

[39] Pokutta *et al.* 2019.

[40] Beck 1941: 45, pl. II, no. 15.

[41] Vorobieva 1973: 84–85, fig. 29.8, 22.

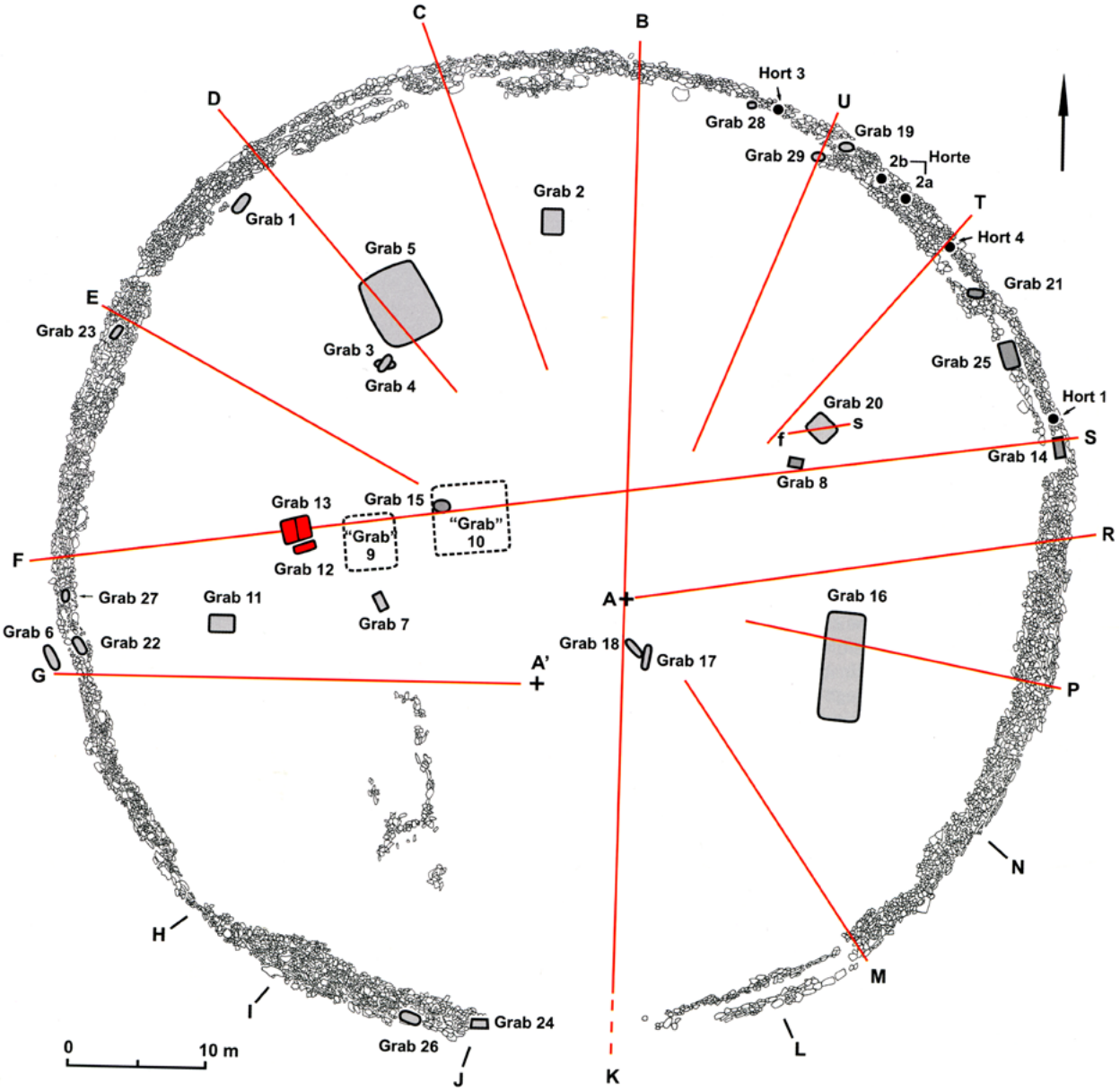

Figure 4. Plan of the excavated graves at Arzhan-2, highlighting in red those containing bleached beads (after Chugunov, Parzinger and Nagler *et al.* 2010: 18, fig. 22)

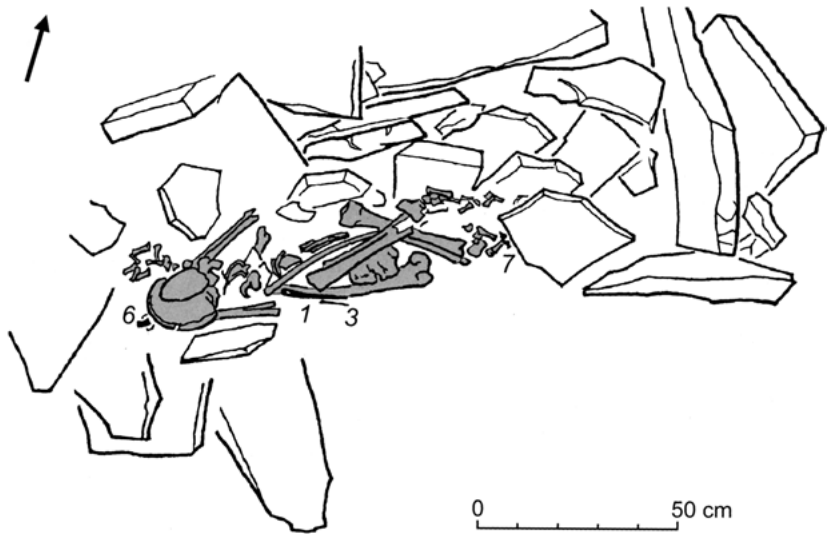

Figure 5. Plan of Grave 12 at Arzhan-2 (after Chugunov, Parzinger and Nagler *et al.* 2010: 72, fig. 70)

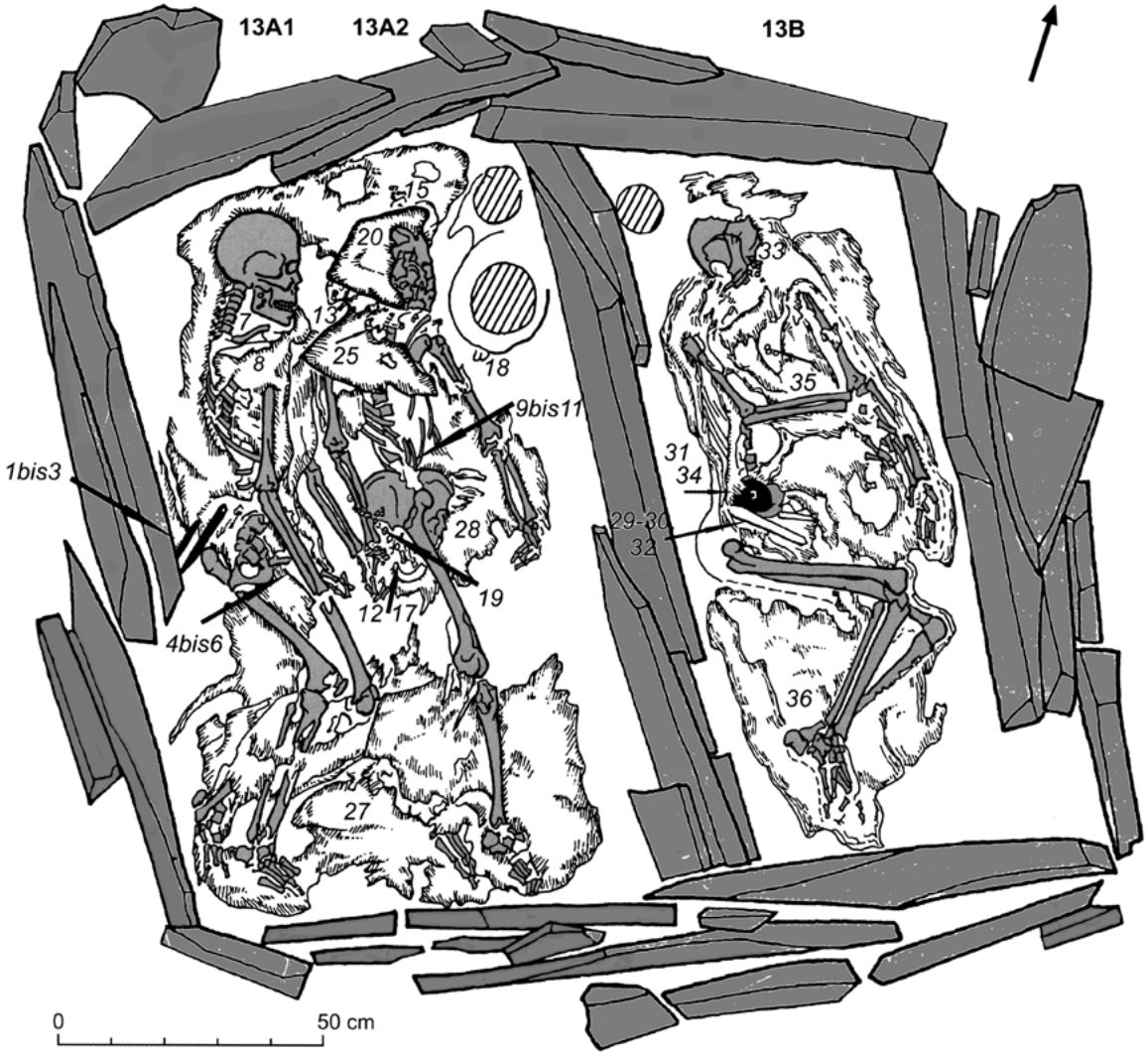

Figure 6. Plan of Graves 13a–13b at Arzhan-2
(after Chugunov, Parzinger and Nagler *et al.* 2010: 74, fig. 71)

beaded bracelet placed with a burial excavated in a large 1st–3rd/4th century AD cemetery at Khangiz-I in the Ferghana valley: the Arzhan evidence now implies that this bead was a re-used heirloom. Another was found in a kurgan in the Pamir region,[42] and a fifth recovered during the large-scale American excavations at Qasr-i Abu Nasr in southern Iran.[43] The exact provenance of this last example is unrecorded: most of the excavated published finds date to the late Sasanian and early medieval periods and come from the latest levels on the citadel, but others offer persistent hints of earlier occupation and this particular bead must also be an heirloom or residual find from the earlier occupation.[44]

A second recent discovery of bleached carnelian beads comes from the site of Jubaji, located seven kilometres southeast of the modern city of Ramhormoz in eastern Khuzestan.[45] Following the accidental discovery of a tomb during irrigation works here, rescue excavations uncovered the remains of a subterranean rectangular tomb constructed of stone slabs which had been plastered on the inside. This held the remains of a pair of bronze 'bath-tubs', each containing the flexed skeleton of a woman, one aged about 17 years and the other 30–35 years, and accompanied by a large number of grave-goods placed inside and around the coffins.[46] Among these there were many beads: banded

[42] Bernshtam 1952: col. pl. opposite p. 300.
[43] This is one of four from the site: Whitcomb 1985: fig. 69a–c, f.
[44] Excluding the reused Achaemenid architectural elements removed from Persepolis in the Buyid period, other early finds include an Elamite clay tablet (Whitcomb 1985: 191), trilobate socketed cast copper alloy arrowheads (Whitcomb 1985: 168, fig. 63bb–dd), carinated pottery drinking bowls (Whitcomb 1985: 136, fig. 51i–o) and sherds of Festoon Ware (Whitcomb 1985: 119, 137, fig. 55m), both dating to the late and post-Achaemenid periods, an inlaid stone bird's head (Whitcomb 1985: 190, fig. 72b) and possibly some of the polished stone bowls (Whitcomb 1985: 177, fig. 67). Most are from the west slope of the citadel suggesting that there had been early occupation on the summit of this outcrop but which had perhaps been destroyed and the material re-deposited when this area was modified to become the citadel of the Sasanian town.
[45] Shishegar 2015.
[46] Dating to the early 6th century BC, these included gold jewellery and miniature clothing appliqués, vessels of silver, copper alloy, stone, glazed composition, bitumen compound, glazed and unglazed pottery, tripod-footed braziers (so-called candelabra), glazed

Figure 7. View of the double burial in Grave 13a at Arzhan-2 (after Chugunov, Parzinger and Nagler *et al.* 2010: 76, fig. 73)

Figure 8. View of the burial in Grave 13b at Arzhan-2 (after Chugunov, Parzinger and Nagler *et al.* 2010: 81, fig. 76)

chalcedony, onyx, sardonyx, amethyst, turquoise, lapis lazuli, hematite, limestone, horn, bitumen, copper alloy, glazed composition and glass, and five types of bleached carnelians: most appear to be heirlooms or ancient tomb-robbers' finds as they date from the 3rd millennium BC (Figure 13).[47]

Within highland Iran or lowland Mesopotamia, few bleached beads are known from the following centuries but this probably reflects the types of sites investigated, and their state of research and publication, rather than true absence. It should be remembered that in any case beads are only ever found in low numbers as

Figure 9. Detail of the beaded necklaces in Grave 13b at Arzhan-2 (after Chugunov, Parzinger and Nagler *et al.* 2010: 82, fig. 77)

composition pyxides, metal mirrors, short iron swords with silver and inlaid copper alloy hilts, decorated bone box inlays, a glazed composition scaraboid seal, and copper alloy pans decorated with seated fishtail goddesses of a type previously thought to be Middle Elamite and disproving the previous interpretation that they had been 'originally fitted on to the armrest of a throne' (Curtis 1990: 16; Collon 1995: 125, fig. 102; now cf. Shishegar 2015: 300–11, col. pls). A gold 'ring of power' armlet was inscribed 'Shutur-Nahunte son of Indada' in Elamite cuneiform, and other short cuneiform inscriptions were on a gold bangle and an eye-stone set into a gold bracelet, both thought to be Elamite female names, and a second eye-stone with a Kassite inscription to the god Enlil which was set into a brooch.

[47] Shishegar 2015: 633–34, col. pl.; Annen and Helwing eds 2017: 211, 271, cats 89–90; they resemble Reade's types A2, B6 and E3.

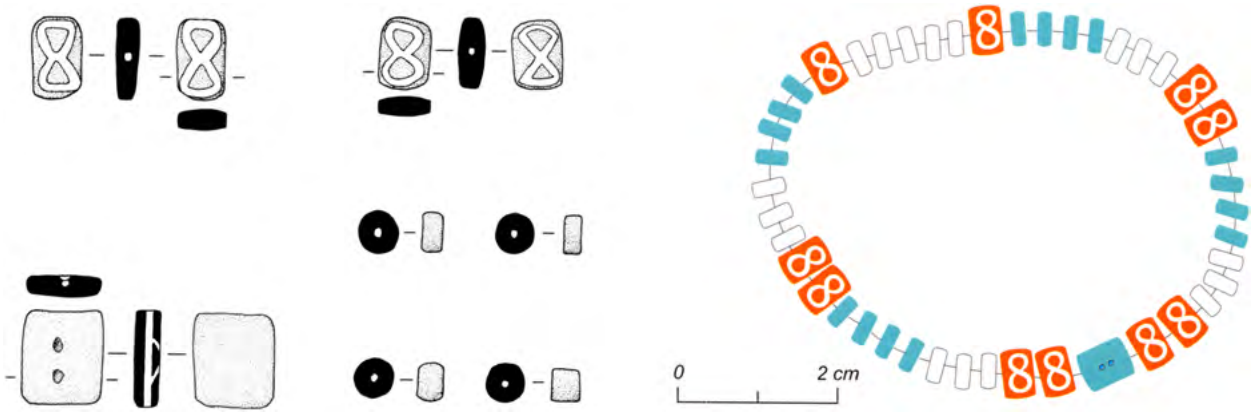

Figure 10. Bleached and plain carnelian and turquoise beads worn by skeleton 2 in Grave 13a (after Chugunov, Parzinger and Nagler *et al.* 2010: pl. 91)

Figure 11. Bleached carnelian beads from Arzhan-2 (State Hermitage Museum, inv. nr. 2917-68; photograph by V. Terebenin, 2017)

Figure 12. Bleached carnelian beads from the art market (The British Museum, inv. nr. 1991,1008 collection)

Figure 13. Multiple views of bleached carnelian beads from the early 6th century BC tomb at Jubaji (after Shishegar 2015: col. pl. 10: 1–5)

casual losses or broken discards at settlement sites, as opposed to cemeteries where they are interred as threaded necklaces.[48] Moreover, among finds excavated in the looted remains of the Achaemenid treasury at Persepolis is a single lentoid bleached bead decorated with a series of short radiating slanting lines around the edge, which is identical to examples known from Iron Age burial sites in southern India.[49] Other bleached beads were found in Persian-period contexts at Ur where the number and variety of hard stone beads suggest a revival of the Indian bead trade.[50] This was a period when the Achaemenid empire reached as far as the Indus, and India is textually attested as a source of gold, ivory, hardwood, textiles and precious oils.[51]

In western and northwest Iran, huge numbers of cemeteries dating to the first half of the 1st millennium BC have been discovered and looted since the late 1920s and late 1950s respectively, although only a few have been investigated archaeologically. Some cemeteries of the later Iron Age IV (Achaemenid) period are also known from this region, but these have not produced bleached beads.[52] However, a single bleached barrel decorated with curving diagonal lines is illustrated among a variety of beads of coloured glass, gold-glass and glazed composition found in jar burials excavated in the Germi region of Iranian Azarbaijan, and dated through associated coins between the mid-1st century BC and late 2nd century AD.[53] A later shaft tomb excavated at Hassan-e Mahale in the Dailaman region, also in northwest Iran, contained a number of beads associated with the interment of a woman: five were bleached carnelians, some of which appear to have been worn as part of headgear, and a 3rd/4th century AD date is suggested on the basis of an accompanying Sasanian glass bowl.[54]

Within central Asia there is a growing number of finds which suggest a slight increase in the number of bleached beads, including some of Beck's so-called Group B, but now dated earlier than he suspected. The earliest of these come from the recent excavation of kurgan 6 at Tasmola-V in central Kazakhstan which the excavator dated to the 7th–6th centuries BC.[55] They consist of two barrels, each decorated with three parallel lines, and a longer barrel decorated with a pair of crossed lines. The same type has been excavated recently in a ritual refuse deposit at the Khorezmian site of Khumbuz tepe in Uzbekistan, and its context radiocarbon dated to the early 6th century BC.[56]

Further east, within Xinjiang Sir Aurel Stein was the first to report bleached beads from Khotan and Yotkan, and these are in the British Museum (Figure 14): one is a sphere decorated with a trefoil device within a circle, repeated on three sides within separate compartments,[57] the second is one end of a bicone decorated with a neatly executed crisscross pattern,[58] and the third is a square tabular bead decorated on each side with an equal-armed cross placed within a diamond border.[59] Others have been reported from more recent investigations, including six from the fortified city of Dzhambulak Kum (Yuansha), located on the east bank of the old bed of the Keriya river between Khotan and Niya on the so-called 'Southern Silk Road': they were attributed to the 'Spring and Autumn Periods' (*c.* 770–476 BC), but the site continues as late as the Western Han dynasty (206 BC–AD 9) and this later date seems more likely.[60] These beads consist of a short barrel with four parallel lines, a fragmentary bicone with multiple parallel lines, a short barrel with three parallel lines intersected by repeating crosses, and three long barrels with slightly more elaborate versions of the same design with additional dots inhabiting compartments formed by the different lines. In 1985 excavations of a Western Han Dynasty (206 BC–AD 220) multiple tomb 41 in Baozidong cemetery in Wenxiu County produced a number of beads, including a necklace strung with eight plain spherical and biconical agate beads, an agate lunate and a drop pendant with gold suspension,

[48] None appear to have been recognised from Iron Age sites in the Levant where bead assemblages are dominated by glass, glazed composition and locally sourced coloured stones, which belong to a wider eastern Mediterranean bead tradition: e.g., Moorey 1980: 117–26; Yassine 1984: 111–31.

[49] Schmidt 1957: 76, pl. 43.17 = Reade 1979: 20, type D12; cf. Jayakumar 2001; Kelly 2013; 2017; Beck 1933: 391–92, pl. LXX, fig. 1, types B17–B18, one reportedly with a punch-marked coin of the 3rd or 2nd century BC. There are no known sources of carnelian or agate in Tamil Nadu but the area is rich in iron ore and the processing and export of this must have been an important part of the local trade economy. It should be noted here that the south Indian Iron Age (*c.* 1200–400 BC) is usually referred to as the 'megalithic period' in the archaeological literature. However, this is a problematic term which ought to be abandoned, not least because these monuments span over three millennia, beginning in the neolithic period and continuing throughout the Early Historic Period (*c.* 400 BC–AD 400) and into the early medieval period (AD 400–1000) (Leshnik 1974). It might be added that there are very few reliable absolute dates for any of these periods. There is also a general tendency to view the local Iron Age as an insular culture with tombs but no settlements, followed by widespread trade and international contact with the West via Indian Ocean trade in the Early Historic Period, but Iron Age settlements have been excavated (e.g., Kadebakele, Kodumanal) and reliance on Classical written sources and Western imports to demonstrate Early Historic trade has distorted the interpretation of the economy with a heavily Eurocentric model.

[50] Woolley 1962: 105–30, pls 22, 24.

[51] Callieri 2004.

[52] Haerinck 1989.

[53] Kambaksh-e Fard 1998: 90, fig. 97; the other beads are reproduced in black and white photographs on pp. 87–92. The coins belong to Orodes II, Mithradates III, Phraates IV, Phraates V, Gotarzes II, Vologases I, Artabanus IV and Vologases III.

[54] Sono and Fukai 1968: 14, 25, pls XLIII.2–3, LXXI.4, 6, 8, 20–21; for the dating and a brief discussion of the glass which may have been made in the southern Caucasus, cf. Simpson 2015: 85.

[55] Stöllner and Samashev eds 2013: vol. II, 655, cat. 370.

[56] Baratov 2019.

[57] The British Museum, inv. nr. MAS 152.

[58] The British Museum, inv. nr. MAS 224.

[59] The British Museum, inv. nr. MAS 191.

[60] Debaine-Francfort and Idriss eds 2001: 214, cat. 108 = Qi and Wang eds 2008: 161, fig. 12.

Figure 14. Bleached carnelian beads from Khotan and Yotkan (The British Museum, inv. nrs MAS 152, 224, 191)

a turquoise short barrel, and eight bleached beads.[61] The latter consist of two barrels with multiple parallel lines, a bicone with a chevron design, a barrel with parallel lines partly connected by diagonals with dots in the intervening compartments, and four barrels decorated with parallel lines intersected by repeating crosses, sometimes with dots in the compartments; one had been over-heated so the entire composition had turned grey.

Similar beads were found in one of the elite mid-1st century AD burials dug into the summit of the mound of Tillya tepe in northwest Afghanistan. Excavations by the late V.I. Sarianidi began here in 1969 in search of Bronze Age settlement and resumed in 1977, and six graves were discovered during what proved to be the final season the following year.[62] The central burial (Grave 4) belonged to a man who was buried with a stunning gold belt, a pair of daggers in turquoise-inlaid lobed gold scabbards, a long sword, composite bows with bone plates at the ears, and the sacrificed remains of his horse; the other burials belonged to women of different ages who were placed in individual graves dug into the upper slopes of the mound on all sides around his grave. It seems most likely that these interments represent a single event marking the death of an important tribal chief. Each was placed in an open-topped wooden coffin placed at the foot of a shaft; all were intact apart from Grave 3 which had been heavily disturbed by rodents (Figure 15). Four bleached carnelian beads are illustrated from this grave and consist of conoids and barrels decorated with crisscross, diamond and concentric designs (Figure 16).

There are different published interpretations of the dress of this and the other individuals interred in these graves, but the overwhelming sense of style of the women was based on a loose layered look with multiple gold appliqués stitched onto their garments (Figure 17). The prevalence of turquoise inlays points to an Inner Asian tribal origin,[63] rather than a proto-Kushan or Yueh-chi dynasty from the nearby settlement at Emshi-depe as proposed by the excavator and others,[64] let alone a ruler with allegiance either to the Saka or Parthians as suggested by others.[65] The quantity and variety of finds varies between different graves: although it is tempting to see these as hints of different ethnic identities, this cannot be tested by scientific analysis as the human remains themselves do not survive. Interestingly, Grave 3 included a pair of gold clasps with strong Greco-Bactrian iconography which had been repaired in antiquity and stripped of the original inlays which strongly suggests the interment of an heirloom piece, perhaps taken during the Yueh-chi sack of a rich Bactrian city in the second half of the 1st century BC.[66] This was an exceptionally rich burial, containing almost 5000 gold objects, including a pair of gold soles originally stitched onto her shoes as a sign of status reminiscent of the pyrites-embroidered soles from kurgan 2 at Pazyryk.[67] The same burial

[61] Qi and Wang eds 2008: 161, fig. 11.

[62] Sarianidi 1985; 1989; 1990*b*; 1999; 2006; 2011; 2012; cf. also Pugachenkova and Rempel 1991; Schiltz 1994: 320–28; Pfrommer 1996; Mordvintseva 2010; Francfort 2011; 2012. Six coins were found with these burials: five were published by Sarianidi and Koshelenko (1982) who concluded on the basis of their identifications that 'as a whole, the necropolis can be dated to the 1st century BC – 1st century AD, i.e. to the time after the fall of the Graeco-Bactrian kingdom but before the foundation of the Kushan kingdom'. One belonged to Heraeus who Cribb (1993) identifies with the first Kushan king, Kujula Kadphises. The coins were re-analysed by the late Dr E. Zeymal (1999) who added an obol of Heraeus and argued for a date in the second or third quarter of the 1st century AD: this slightly later date is now generally accepted, although the date of deposition could be slightly later as there is no *a priori* reason why it should have been in mint condition when interred.

[63] Francfort 2012; Koryakova 2000: 109–12.

[64] Sarianidi 1985; 1989; Pfrommer 1996; Yatsenko 2001: 75.

[65] Bernard 1987; Pugachenkova and Rempel 1991; Schiltz 1994; 2012; Olbrycht 2016.

[66] Sarianidi 1985: 138–43, 236, ill. 81–84; 1989: 73–78, fig. 28; Hiebert and Cambon eds 2011; 254–55, cat. 160. This pair of clasps has been discussed by a number of authors but these have focused on elements of the iconography and the difference between its date – as suggested by this – and the date of burial have generally eluded attention (Boardman 2003: 354–57, fig. 4; Olbrycht 2016: 21–22), as has the significance of the loss of the original inlays and later repair when the object was transformed from an object of polychromy into one of pure gold (the original appearance is highlighted in the drawing published by Mordvintseva 2010: 179, fig. 3.5).

[67] Sarianidi 1985: 240; 1989: 67–84; Hiebert and Cambon eds 2011; 260, cat. 170; cf. Simpson and Pankova eds 2017: 115, cat. 39.

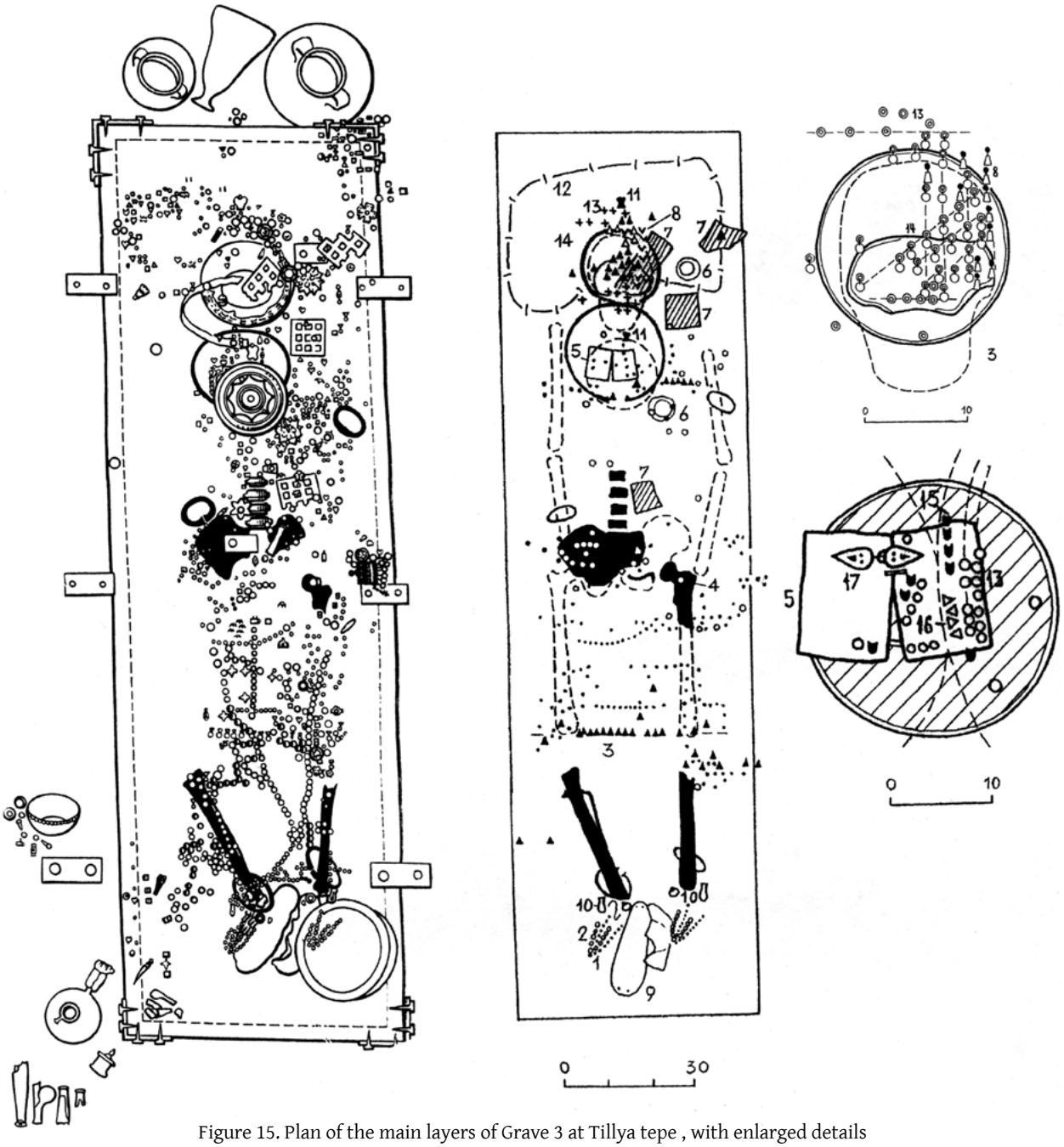

Figure 15. Plan of the main layers of Grave 3 at Tillya tepe , with enlarged details of the head and chest (after Sarianidi 1989: fig. 24)

Figure 16. Bleached carnelian beads from Grave 3 at Tillya tepe (after Sarianidi 1985: 244, no. 63)

also contained a fragmentary engraved ivory pocket comb with a rounded handle, the decoration on which was highlighted with indigo pigment: this has close stylistic parallels from Taxila and is one of the few certain indications of contact with the Kushan state to the east, rather than connections with Inner Asia.[68] It

[68] The comb was illustrated several times by the excavator (Sarianidi 1985: 200, 243, ill. 142; 1989: 80–81, fig. 29.4) and exhibited in the various catalogues of a recent travelling exhibition (e.g., Hiebert and Cambon eds 2011: 263, cat. 180) but without comment on the pigment until this was analysed and published with the kind permission of Dr Masoudi, then director of the National Museum of Afghanistan (Ambers *et al.* 2014: 42, figs 56–57). Several ivory combs with similar rounded back handles were excavated by different expeditions in the mound of Sirkap at Taxila in northern Pakistan: they have

Figure 17. Three different reconstructions of the dress of the person buried in Grave 3 at Tillya tepe (after Sarianidi 1989: fig. 25; Yatsenko 2001: pl. 9, after drawing by E. Kurkina; Rooijakkers 2011)

seems likely that, like the comb, these beads are Kushan products and originated or were traded from a city such as Taxila where nine bleached beads were found at Sirkap, all but one from Saka/Parthian contexts of the 1st century BC and 1st century AD, and another 16 from the Bhir mound, where half were from Stratum II which is dated to the 3rd century BC.[69]

A bead of this type was given to Aurel Stein by a villager in 1927 when he was excavating cairn tombs on the hills above the site of Moghul-Ghundai in the Zhob district of Baluchistan and had been 'picked up on the hill side'.[70] Although a surface find, Stein suggested that it probably came from one of these cairns and his excavations showed them to date to about the 1st century.[71] Similar bleached beads are reported from Sarmatian graves in the lower Volga region, lower Syr darya, Chirik Rabat, and the Amu darya delta, which are dated to between about the 5th or 3rd century BC and 2nd century AD. These include examples from Kurgan 19 at Tuz-gyr, on the Prisarykamysh delta 100 km southwest of Kunya-Urgench, where the grave-goods included five bleached beads: a short cylinder with an

dotted circle or floral designs and, in one case, a duck on one side and a facing couple on the other (Marshall 1951: vol. II, 655–56, vol. III, pl. 199, no. 21 = stratum II; Ghosh 1947/48: 79–80, pl. XX = phase III; cf. Dani 1986*b*: 96). This region is probably also the origin for rounded or square-handled ivory combs excavated at Begram (Tisucká and Stančo eds 2016: 211, cat. 99, decorated with a duck of similar character to the furniture overlays excavated at the same site although the details of how the wings are rendered is completely different as the latter are typically cross-hatched: cf. Hackin 1939: figs 127–29, 132–35, 143, 149, 175, 183, 198, 204, 214–21, 225–26), Dal'verzin Tepe (Pugachenkova, Rtveladze and Kato 1991: 269, colour plate, cat. 92, decorated with a topless seated woman surrounded by servants), Kampyr tepe (Pugachenkova, Rtveladze and Kato 1991: 285–86, colour plate, cat. 158; Nikonorov 2004, decorated with a cockerel on one side and a woman's face on the other), and now two from a multiple tomb at the ancient port of Dibba on the Arabian coast of the Gulf of Oman (Jasim 2006: 224–25, figs 41–48; cf. Potts 2011, decorated with topless seated women and flowering vegetation). All date between the mid-1st and 2nd centuries. Colour photographs indicate that the incised decoration on the Begram comb and at least one of the combs from Dibba were also highlighted with pigment but this has neither been noted previously or the remains scientifically analysed; the designs on the Kampyrtepe comb were simply drawn in black ink, possibly with white highlighting, and differs from the others in the absence of engraving. A different form of comb was found with a 1st century AD burial of a young woman at Kok tepe (Rapin, Isamiddinov and Khasanov 2001: fig. 10, decorated with addorsed horses).

[69] Marshall 1951: vol. II, 737–38, tables A, C; Beck's manuscript was considered too long and was published in an edited version which omitted the illustrations.

[70] Stein 1929: 47, pl. XII; this was assumed by During Caspers (1972: 90) to be Harappan and included by Reade (1979: 14, fig. 2f) as a comparison for 3rd millennium BC examples but the designs of these are slightly different.

[71] Stein 1929: 46–48, pls X, XII: the excavated finds consisted of iron leaf-shaped arrowheads and a spear head, whetstones, a wooden comb, a silver bangle which has a close parallel from a grave in the Germi region of Iranian Azarbaijan (Kambakhsh-e Fard 1998: 45, fig. 94), copper alloy finger rings with engraved flat bezels, late period pottery and a cast copper alloy eye-liner flask supported on three feet. This last class of object has also been mistakenly attributed a 3rd or early 2nd millennium BC date in some recent literature following inclusion in the Red List for Afghanistan (e.g., ICOM 2006) but has close parallels from Taxila where two were excavated in Stratum II at Sirkap, one of which was part of a collection of metal tools, utensils and beads excavated in a small property in square 110.52' of Block G which post-dates the reconstruction of the large house (1G) following the earthquake of AD 30 (Marshall 1951: vol. I, 168, 205, vol. II, 584, no. 207, vol. III, pl. 171, *t*; cf. also Luczanits ed. 2008: 348, cat. 276).

oval design on the side and two barrels and two spheres with net-patterns. These were originally dated to the 4th to 2nd centuries BC on the basis of similar finds of that date from Chirik 2, but have been re-attributed more recently to the 1st to 3rd centuries.[72] Tomb 2 at Aksaimak 5, originally dated to the 3rd or 4th century BC and thought to be Sarmatian, contained four black bleached carnelian beads: a barrel and two spheres with double rows of empty polygons and another sphere with a hatched line around the centre and a circle around each perforation.[73] The dating of this series needs closer scrutiny but clearly they belong to a common series. The large-scale excavations at Toprak-Kala produced several similar beads from casual loss contexts in the residential quarter, including a sphere decorated with a row of crosses, and a barrel and two spheres with a honeycomb design with a dot in the centre of each compartment. They were dated between the 3rd and 6th centuries.[74]

Revival in the late antique and early medieval periods

Between the 6th and 10th centuries other varieties of bleached carnelian bead became popular. These are usually spherical or tabular and decorated with stylised vegetal scrolls, equal-armed crosses, monogram devices (described by Beck as 'plant' designs) or compartments containing secondary designs (Figure 18). Whereas the latter represent an evolution of earlier patterns, the others represent a major cultural change and as only one example has been published from south Asia – from Rang Mahal in Rajasthan – it seems likely that this tradition is not local. The possibility of an Iranian origin for these was first suggested by the late Peter Francis Jr., based on his observations of examples circulating through the art market; this view was later modified to possibly extend into the early medieval period.[75] The most telling feature are the presence of motifs resembling Sasanian monogram devices used on personal seals and as emblems on textiles:[76] although those are composed of letters, they resemble the *tamgas* used by Iranian and Turkic steppe nomad cultures.[77] The vegetal scrolls are a more widespread pattern which dispersed widely during Classical times but others resemble felted patterns and perhaps add credence to the idea that they were, made within Eurasia rather than south Asia. The same has been suggested on the basis of the pomegranates motif as these were a popular motif in ancient Iranian art.[78]

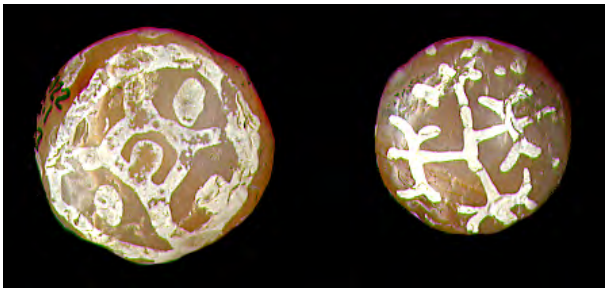

Figure 18. Bleached carnelian beads acquired in the Perm region of western Siberia and Crimea respectively (The British Museum, inv. nrs 1922,0601.292–293)

The distribution of this latest class ranges across Iran, Iraq, Syro-Palestine, the Caucasus, Crimea and central Asia, but with very few from south Asia.[79] Within these regions individual findspots include five out of a total of 95 excavated graves in a rural Sasanian cemetery at Tell Mohammed 'Arab in northern Iraq.[80] Physical anthropological analysis of the human remains indicated that four of these belonged to women aged between 16–17 years (50S:23), 16–33 years (49T:24), 20 years and interred with a five month foetus (51T:05), 28–32 years, interred with a 2.5–3.5 year girl (49T:14); the last was aged 17–18 years but his/her gender could not be determined (51T:09).[81] However, tabulation of the other finds from these graves indicates that, unlike Arzhan-2, there is no obvious similarity in the pattern of grave-goods or style of bead stringing between these five individuals, nor were they located in close proximity: on this basis it is impossible to suggest a relationship between these individuals and the reasons behind their selection of bleached beads is therefore obscure.

At other sites only single examples were found, but a larger number are preserved among grave-goods from the Sasanian cemetery at Merv held in the National Museum in Ashgabat (Figure 19a–f). Interestingly, only two have been reported from the past 120 years of excavations and surface collections at the city-site of Merv itself.[82] Beads of assorted

[72] Wegener 2010: pl. 94, after Trudnovskaya 1979: 108, fig. 4.16–20.
[73] Dr V.N. Yagodin, pers. comm., 16th June 1991; the excavator considered them to be Sarmatian and to have been brought from the northern Black Sea region.
[74] Trudnovskaya 1952: 121–24, pl. II.6–8.
[75] Francis 1980; cf. Francis 1984; cf. Dubin 1987: 363; Francis 1999: 53.
[76] Unvala 1953; Bivar 1959; de Menasce 1960; Frye 1964; Göbl 1971.
[77] Nickel 1973; Manassero 2013.
[78] Chizhova 2004.
[79] Kovalevskaya 2001; Simpson 2003*a*: 65–66; Adamova and Nikitin eds 2004: 58, cats 68–69, 71; Chizhova 2004; Eger 2010; others were found during excavations at the Kushano-Sasanian settlement of Dzhiga tepe in northern Afghanistan but are believed to have been lost along with the other finds (Dr V.N. Yagodin, pers. comm., 16th June 1991); the preliminary results of these excavations were published by Pugachenkova 1979, illustrating a variety of stamped pottery which is analogous to the well-dated assemblage from Zar tepe; a preliminary report was also published on a hoard of sealed Kushano-Sasanian clay bullae found at the site (Kruglikova 1984).
[80] The excavations were directed by Dr Michael Roaf, and the physical anthropological analyses carried out by Dr Dianna Bolt and presented in her PhD dissertation (Bolt 1991); a preliminary report was published on the excavations themselves which includes photographs of three of these beads (Roaf 1984: pl. XIc). A review of the archaeological evidence for Sasanian funerary practices in Mesopotamia is given by Simpson 2018.
[81] Bolt 1991: 71, 74, 77–78, 83, 110.
[82] One was found by the Carnegie expedition to Merv in 1904 (unpublished: Peter the Great Museum of Anthropology and

Figure 19. Bleached carnelian beads from the Merv cemetery (photograph: author)

materials, including carnelian, greenstone, lapis lazuli, limestone/marble and serpentinite were found in the 1992–2000 excavations co-directed by the author at various places in the citadel, lower city and fortifications of the Sasanian city-site of Gyaur-Kala, but only a single bleached bead was found. This contrast between recovery rates from burial and residential contexts probably reflects the greater value afforded to decorated beads: casually dropped items, like silver coins or other items of high value, were rapidly retrieved in antiquity and therefore removed from the normal archaeological record, and surface finds were equally likely to be scavenged after

Ethnography (Kunstkamera), inv. nr. 1383.71) and the second during the 1992 season of surface survey by the International Merv Project and found in Gyaur-Kala (IMP square 15.J.III).

rain. [83] The excavated finds suggest they are a late Sasanian revival which certainly continued into the medieval period as six were found in a *c.* 11th–12th century context during excavations directed by Dr Julian Reade at Ras al-Hadd in Oman;[84] and another was found in a similar late context in a cairn tomb at Samad,[85] and related beads have been found at the medieval port of Brahminabad.[86]

Conclusions

Beads are small, light and attractive, and can be worn or transported over huge distances and treasured over long periods of time unless accidentally lost or deliberately interred in funerary or ritual deposits. There has been a long tradition of imitating the appearance of particular beads in different materials or types of decoration: bleached carnelian beads are one example of a small-scale 3rd millennium BC Indian tradition of imitating banded chalcedonies which survived and spread throughout the subsequent millennia, glass and glazed composition imitated coloured stone, plastic now imitates glass.

Beck's initial typology of so-called 'etched carnelian' beads was important in its extension to his pioneering classificatory approach to the cross-cultural analysis of beads but has now served its day and should be discarded. The present paper is offered as a transitional stage towards a new classificatory system which embraces better documentation of the beads themselves, especially the drill holes and details of bleaching, which entirely follows the steps of Beck as he was a strong early advocate of experimentation and scientific analysis, as well as the more rigorous classification of beads.[87] The use of the term 'etched carnelian' should be dropped in favour of bleached carnelian, as Kenoyer has cogently demonstrated.[88]

There is a definite decrease in quality of these beads through time, particularly as one enters the beginning of the 1st millennium AD. This suggests that there were multiple places of production from this period onwards. These need not have been permanent workshops and we should not exclude the possibility of itinerant craftsmen. Kenoyer has also suggested that some individuals may have recycled ancient beads, which might explain their heavily worn or battered appearance: this is particularly apposite where there is no other evidence for carnelian in the bead assemblage, as in the case of some pastoralist nomad cemeteries such as Myntobe (Figure 20).[89] In these cases, they may represent lengthy curation or reuse after discovery on the surface or even grave robbing in antiquity. Treister has suggested the latter may explain finds of ancient Near Eastern scaraboid seals in middle Sarmatian graves in the lower Don region,[90] and the suggestion is particularly attractive when such finds are in unweathered condition,[91] and there is ethnographic proof from western Iran of tribeswomen wearing Iron Age beads discovered during the looting of cemeteries in Luristan in the late 1920s.[92] It is worth noting that bleached beads are rarely found in large numbers at any single site and the latter vary greatly in type, ranging from the royal treasury at Persepolis, urban centres in central and south Asia, and Buddhist monasteries to urban and rural cemeteries, south Asian megalithic tombs and nomadic graves from eastern Arabia and Syro-Mesopotamia to central Asia, the north Caucasus and the Eurasian steppe. Wherever these beads were made, it is clear that they were adopted across highly diverse socio-cultural environments: where deposited in graves they often occur singly and strung with other shapes and colours of bead as if valued as amulets, and those from Arzhan-2 are exceptional in having multiple examples on particular necklaces. Most were

[83] This point has been explored by the author previously in the context of other types of finds, and not just high-value coins (for which Merv was a known mint), yet excavations for over a century have failed to produce any, and sharp glass, cast metal fragments and wrought iron and sheet metal were also absent from the archaeological deposits, supporting the interpretation that these were removed from circulation in antiquity as part of local recycling industries (Simpson 2004). During the period the author excavated at Merv from 1992–2000, he regularly observed local residents and, at one point, Baluch camel-herders combing the site in the early morning or after rain in search of anything of value or interest, and when we employed local workboys for dry-sieving they showed a suspiciously high level of interest in finds recovery, to the extent that one wonders if this attempt at full recovery is distorted for object categories such as beads, coins or even astragali which were sought after as gaming pieces (the latter has also been observed during excavations at Gordion: Young 1962: 154).

[84] Reade 1989: 23; 1990: 37, fig. 37; Nayeem 1996: fig. 12; the excavator suggested that they were being made locally, in which case either a local substitute for the preferred alkali etching agent of *kirar* was employed or the leaves of this were imported for this purpose by the craftsman responsible: see Holé, Mongiatti and Simpson, this volume. The dating is provided by imported Iranian splash-glazed hatched sgraffiato and a single sherd of champlevé pottery: during this period the site is suggested to have played a similar trading role as Sohar previously and Qalhat subsequently, although it was significantly smaller than either (Priestman 2008: 276).

[85] Yule 2001: vol. 1, 97, fig. 5.9, vol. 2, pl. 450. It is currently exhibited in a showcase in the National Museum in Muscat as evidence for contact between Oman and India but mis-attributed a 3rd millennium BC Harappan date (personal observation, April 2019).

[86] Dikshit 1949.

[87] Beck 1930; 1933; 1941.

[88] Kenoyer 2003; 2020.

[89] One was found strung with two large spherical weathered glazed composition and a weathered dark blue flat rectangular glass bead decorated with a pair of wiggly white trails across the centre: they had been worn as a bracelet in a child's grave in a Kangui culture cemetery broadly dated between the 1st and 4th centuries (Podushkin 2019).

[90] Treister 2019.

[91] Note for instance the presence of a Greco-Persian scaraboid in excellent condition found with an amber lion pendant and a malachite gem in a silver setting in Grave 5 at Tillya tepe (Hiebert and Cambon eds 2011: 283, cat. 212): this is unlikely to have been found locally in northwest Afghanistan as this type of seal circulated primarily in Anatolia and adjacent regions, and perhaps adds a tenuous connection between this buried young lady and the Sarmatian parallels offered by some of the other finds (cf. Mordvintseva 2010; Bârcă 2012: 156; Francfort 2011; 2012).

[92] Simpson 2001.

Figure 20. Bleached bead worn with beads of mixed materials on a child's wrist from the 1st–4th century pastoral nomad cemetery at Myntobe, southern Kazakhstan (photograph: Dr A. Podushkin)

probably worn on necklaces but a grave from Khangiz I in Ferghana indicates they could be strung on beaded bracelets, another from Myntobe was worn on a child's bracelet, and others may have been seen as amuletic pendants rather than simple beads. In a PhD study of early Iron Age beads excavated in southern India, Kelly raises

> 'the question of how and why some kinds of beads, in particular the bleached carnelian beads discussed above, could appear to be so standardized in their motifs of decoration, shapes, etc., if they were not produced by specialist producers. I argue that these motifs were ideologically significant, and if not meaningful in the sense of conveying a particular lexical meaning, were meaningful within a framework of belief and practice that made sense to the people who wore and made them. As with beads and ornaments in many other parts of the world, wearing the bleached carnelian beads and being buried with them may have been an act of expression of social and cultural identity'.[93]

The ideological meaning of a given motif is unlikely to have been the same across the huge distances and languages of India and Eurasia but the significance as cultural markers or amulets of a particular meaning should not be under-estimated.

The excavations at Arzhan-2 have added another type of bleached carnelian bead to the existing typologies, provide a firm date for it and extend the date of these back to the 7th century BC. There is still a lengthy gap between these and the well-known 3rd millennium BC series and it is inconceivable that such a specific technology was completely lost and then re-invented. However, the early descriptions of how these beads were decorated raise interesting questions over the relationship of their lithic technology to the pyrotechnology of heating, Majumdar's reference to moulds,[94] the use (at the latest date) to a steel pen (rather than presumably a brush earlier on), how pastoral nomads could easily recognise the bushes of the alkali-rich *kirar* plants because of their bright berries, and how this plant was widely distributed. Over time the technology appears to have spread out of India as some of the later beads, including almost all of Beck's so-called Group C, are not known from there, and this implies the use of alternative sources of plant alkali. Like many modern fakes,[95] beads of the latest types are less well made than the 3rd and early/mid 1st millennium BC bleached carnelian beads, from initial shaping of the bead, drilling, application of the design and roasting: they are often roughly shaped, the perforations off-centre, designs uneven and the colour of the stone is salmon-pink or violet rather than orange or dark reddish. Kenoyer has observed that 'the carnelian and drilling look like it is from south Asia or craftspeople using double diamond drilling but the white designs are very light and less carefully executed'.[96] There is much more research to be done on these beads. More experimental work on bleaching will build on unpublished research by Kenoyer and the research reported in this volume by Holé; greater use of silicone moulds of bead holes and examination of the tool marks on them using Scanning Electron

[93] Kelly 2013: 163.

[94] Majumdar 1934: 47; see Holé, Mongiatti and Simpson, this volume.

[95] These are prolific and include some with combined figural and geometric designs (e.g., Bonhams 1995: 44–45, lot 215).

[96] Dr M. Kenoyer, pers. comm., November 2019.

Microscopy (SEM) will help understand the relationship between decorating and drilling; Instrumental Neutron Activation Analysis (INAA) or Laser Ablation-Inductively Coupled-Mass Spectrometry (LA-ICP-MS) is required to group beads according to composition and suggest origins for the carnelian. This paper is simply a small step in that direction.

Acknowledgments

My interest in bleached beads began through encountering examples at Sasanian sites while working in Iraq in 1985/86 and then central Asia from spring 1991 onwards, at which point I began gathering information on others found in these and other regions, although there are undoubtedly far more than I have mentioned here. I am very grateful to many colleagues for kindly sharing their thoughts and data, including Dr Sergei Baratov, Dr Anastasia Chizhova, Dr Marina Daragan, Dr Alexey Furasiev, the late Dr Ian Glover, Dr Mark Kenoyer, Dr Aleksandr Podushkin, Dr Julian Reade, Dr Michael Roaf, the late Dr Victor Sarianidi and Dr Vadim N. Yagodin; Dr Oliver Moore for translating Chinese papers; Anastasia Triponel and Dr Georgi Parpulov for helping with the Russian literature; and Dr Svetlana Pankova and Dr Konstantin Chugunov for pointing me to more recent publications from Xinjiang and Kazakhstan respectively. I am deeply indebted to the reviewer for his rapid, frank and positive comments on an earlier version of this paper which has been revised accordingly. All errors of fact or interpretation remain mine.

In hoc signo vinces: the victory of the Scythians over the offspring of their slaves as a manifestation of divine providence (Herodotus, *The Histories* 4.1 [3], 3, 4)

Nikolay Yu. Smirnov[1]

In memory of Ivan Mikhailovich Steblin-Kamensky

Abstract

This short paper proposes a new interpretation of the famous story from the fourth book of the *Histories* of Herodotus telling about the victory of the Scythians over the offspring of their slaves with the help of horse whips (Herodotus, *The Histories* 4.3).[2] Parallels between the text of Herodotus and religious texts of Zoroastrian (Avesta) and partly Vedic (Atharvaveda, Ṛigveda) tradition reveal the structure of a ritual associated with fighting evil forces, betrayal and breach of contract, aimed at recreating the balance in the world and victory of good forces. The main instrument of this ritual is a horse whip, and its patron could be Mitra/Mithra, the guardian of concord and world order. The implicit motif of the plot in question is the use of the whip as a ritual instrument for appropriation of native land. This motif can be compared to the expansion of the Var by Yima with help of the whip given to him by Ahura Mazda.

Keywords: Herodotus; Scythian logos; Scythian victory; slaves; whips; Avesta Mitra/Mithra

'The earth is the staff, the atmosphere the embryo,
the heaven the whip, the lightning the whip-cord;
of gold is the tip'[3]

'The weapons we fight with are not the weapons of the world.
On the contrary, they have divine power to demolish strongholds'[4]

'1 [3] Now when the Scythians had been absent from *their own land* for eight-and-twenty years, as they were returning to it after that interval of time, they were met by a contest not less severe than that which they had had with the Medes, since they found an *army of no mean size opposing them*. For the wives of the Scythians, because their husbands were absent from them for a long time, had associated with the slaves.

3 [1] From these their slaves then, I say, and from their wives had been born and bred up *a generation of young men*, who having learnt the manner of their birth *set themselves to oppose the Scythians as they were returning from the Medes*.

[2] ***And first they cut off their land by digging a broad trench extending from the Tauric mountains to the Maiotian lake***, at the point where this is broadest; then afterwards *when the Scythians attempted to invade the land, they* ***took up a position against them and fought***;

[3] and as they fought many times, and *the Scythians* ***were not able to get any advantage in the fighting, one of them said***: "What a thing is this that we are doing, Scythians! We are fighting against our own slaves, and we are not only becoming fewer in number ourselves by being slain in battle, but also we are killing them, and so we shall have fewer to rule over in future. Now therefore to me it seems

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[2] Herodotus, *The Histories* 4.3, quoted above by Loades this volume; for the first time the idea that Herodotus's text 'hides' the structure of a certain ritual was proposed in the materials for the seminar 'Archaeology as Academic Discourse. The Classical Tradition Compared to Prehistoric Archeology' held in Rome in October 2005 as part of the Northern Archaeological School for graduate students 'Dialogues with the Past'. The materials were not published. The idea was discussed in 2013 in Kiev at the conference 'Pre-Islamic Middle East: History, Religion, Culture'. This anthology presents a revised and updated version of the article published in Russian (Smirnov 2014). I express my deep gratitude to Yaroslav V. Vassilkov, Viktoria Yu. Kryukova and Aleksandr A. Sinitsyn for their valuable comments made during discussions of the manuscript of this article and pointing at the literature concerning specific aspects of the research, as well as the preferable translations of the Greek, Vedic and Avestan texts in English. The final choice of the translations and certain bias in the references towards specific historiographical works remain entirely the author's responsibility. Without doubt, the questions raised here require a more comprehensive analysis and this paper is only the first step in this direction. This paper was written within the framework of the programme of scientific research of the state academies of sciences of the Russian Federation on topic No. 0184-2019-0004 'Interaction of ancient cultures of Northern Eurasia and civilizations of the East in the era of paleometal (4 thousand BC - 1 thousand BC)'.

[3] Atharvaveda IX.1.21.

[4] 2 *Corinthians* 10:4.

Figure 1. Silver vessel from the barrow No 3 of the Chastye kurgany burial ground near Voronezh. Excavations of the priest S.E. Zverev and doctor of medicine A.I. Martynovich, 1911. Photo I.F. Chistyakov from the 1911 drawing by V. Yazykov (photographic department of the Scientific Archive of the IHMC RAS III-12197. © Institute for the History of material culture Russian Academy of Science, IHMC RAS)

> good that ***we leave spears and bows and that each one take his horse-whip and so go up close to them***: for so long as they saw us ***with arms in our hands***, they thought themselves equal to us and of equal birth; but when they shall see that ***we have whips instead of arms***, they will perceive that they are our slaves, and having acknowledged this they will not await our onset".
> 4. When they heard this, *the Scythians proceeded to do that which he said*, and the others being panic-stricken by that which was done *forgot their fighting* and ***fled***. Thus the Scythians had ruled over Asia; and in such manner, when they were driven out again by the Medes, they had ***returned to their own land***' [emphasis added].'[5]

The structure of the cited locus is clear, and its syntax can be reduced to several consistent and interconnected events. The Scythians leave their native land; their wives cheat on them with slaves; as a result of betrayal children are born; the Scythians approach the limits of their native land; illegitimate young men dug out a dyke, expropriating the land from the real owners and isolating it; illegitimate young men and the Scythians enter the battle for the land; the outcome of the battle is unclear; the Scythians disarm and change their status; the Scythians use a 'magic weapon' and triumph; the illegitimate young men get punished and run away in disgrace; the Scythians return to their native land. This is the 'Scythian model' of the use of a horse whip as a decisive tool in the confrontation in the *Histories* of Herodotus.

In my opinion, this well-known and frequently commented initial passage from the fourth book of the *Histories* of Herodotus still holds new possibilities of interpretation. For a long time, interpretations of this episode of Scythian history boiled down to the following idea: the battle with the offspring of slaves who excavated a broad dyke, and gaining victory over them with the help of psychological pressure, in fact a threat, was a real historical event. The main debate was on whether the opponents of the Scythians were really the offspring of their slaves, or whether the story was about conquering some local, previously dependent, tribes. There was also a version supposing that this story could be a distorted description of the conflict between the Scythians and the Cimmerians. Another controversial question concerned the interpretation of whips as either real weapons, as recorded by ethnographers among Eurasian steppe nomads, or as a symbol of the slaveholder's power, which is more characteristic of the ancient tradition (Figure 1).[6] Over the last decade, the version about the folklore character of described plot has gained popularity. Undoubtedly, there are certain reasons for this.[7] Nevertheless there are opposing opinions about the environment in which the plot originated. Askol'd Ivanchik writes about Scythian folklore and Scythian epic tradition, admitting the 'ethnographic character of some parts of the story'. On the contrary, Vladimir Kisel denies the possibility of 'using them [specific episodes of the plot] to reconstruct Scythian history', indicating that this fragment of Herodotus' Scythian logos was made in 'Greek tradition and has no connection with Scythian folklore'.[8]

[5] Herodotus, *The Histories* 4.1 [3], 3, 4. I used this fragment while working on an earlier version of this which was published in Russian (Dovatur, Kallistov and Shishov 1982: 99, 101) but in other cases I referred to the full text in Russian (Utchenko ed. 1972). Translators and editors of these editions used Russian word 'knut' (masculine noun) to describe the Scythians' weapon: a whip. Probably, here it would be more appropriate to use the word 'plet'' (feminine noun) which is closer to the Greek original: μάστιξ. Compare with an epithet 'Sraoša's lash' in Andrés-Toledo 2016: 284, and '*sraošō.čaranā-*' in Bartholomae 1904: 1636–37. It reveals the whip's connection with Sraosha's cudgel (Kreyenbroek 1985: 175, n. 63). In the hymn 'To the honey lash' in the Atharvaveda, the lash has clear female connotations (Atharvaveda 9.1). In this article, I refer to Russian translation made by Tat'yana Ya. Elizarenkova 2007: 46–49, 222. Here, I refer to this English translation of Herodotus (Macaulay 1890: vols 1–2); further reference will be given only to the text in Greek and when Russian translation is cited, the specific edition will be indicated.

[6] The bibliography can be found in Russian (Dovatur, Kallistov and Shishov 1982: 203–205) and English (Asheri, Lloyd and Corcella 2007: 574–75).

[7] Ivanchik 2005*b*: 224–26; Kisel 2015*b*: 219–24.

[8] Kisel 2015*b*: 229. It seems especially strange that Kisel, who conscientiously collected and commented on a number of folklore and epic parallels with the plot of overcoming the enemy with the help of 'magic' means, in particular, whips, and also noted the 'special

In this paper, I deliberately do not analyse the folklore version of the origin of the story about the war between the sons of slaves with the Scythians. It certainly has some advantages, but I prefer to emphasise not just the common structures, but, above all, the semantic parallels with the Indo-Iranian religious tradition, which seems more appealing to me.

At the end of this brief, and far from comprehensive, overview of existing concepts it is necessary to mention an additional symbolic meaning that the whip/lash/scourge had in the *Histories* of Herodotus. This is emphasised in other parts of his work, primarily in the history of the Persians, where the whip/lash/scourge, according to the consolidated opinion in Classical studies, is depicted by Herodotus as a tool of the despot or tyrant and a symbol of his power and will.[9] This was most vividly described by François Hartog: 'the *despotes* exercises his power over people's bodies, marking them as he will, in the first place with the whip'.[10] We can reduce various situations where Persians used the whip/lash/scourge to two morphologically different, yet semantically similar, 'Persian models'. On the one hand, the whip was employed as a tool for punishing wrongdoings in accordance with the king's will. In the second, using the whip as a tool for a kind of inducement of various actions by troops, most often related to border situations: war, river crossing or digging a dyke. However, both models appear to be foreign to Herodotus and seen as a manifestation of 'Asian barbarity'.

In the Scythian logos, these models are absent, at least due to the fact that from the point of view of social structure, Scythian society was rather a chiefdom than a form of Oriental despotism or Greek tyranny.[11] Moreover it should be emphasised that, in considered locus, the Scythians did not use a whip/lash/scourge but rather a horse whip,[12] the essential attribute of a grown-up warrior-rider in nomadic culture. In addition, in my opinion, Herodotus implicitly and deliberately contrasts the *negative* 'Persian' context of the use of the whip/lash/scourge and *positive* 'Scythian'.[13] It is possible therefore that a direct indication that the Scythians used horse whips in the fight against the offspring of their slaves contained not only ethnographic determinative, but also some moralizing overtones, given that they were fighting for the righteous cause, returning their homeland.[14]

Before proposing a new interpretation of the text, it is worth asking some questions which seem evident, but for some reason do not appear to have attracted attention before:

- could a broad dyke, dry or filled with water, dug out by slaves' offspring be a real obstacle to Scythians?
- why did the thought of using a whip occur to the only (sage?) Scythian?
- why did the sons of slaves, who were born of free women and had not been slaves for a single day, demonstrate the slave psychology in the form of unconditional obedience when they saw horse whips?
- why should the Scythians use a horse whip in order to overcome the resistance of the offspring of slaves and regain their own lands?

role of whips in the nomadic world ... in the religious-magic sphere', concluded that *The Histories* of Herodotus 'have not even a hint of any sacral function of the whip' (Kisel 2015*b*: 222). Apparently, my paper on the same subject which was published two years earlier was unknown to him.

[9] This was well-demonstrated in Hartog 1988: 332–34; Lateiner 1989: 129, 180; Provencal 2015: 21, 23, 54, 128, 208–210; Priestley and Zali eds 2016: 236, 313–18.

[10] Priestley and Zali eds 2016: 332.

[11] I disagree with Hartog 1988: 332, who automatically extrapolates 'Persian models', demonstrating the despotic nature of the power of Persians, to a story from the Scythian logos. I suspect that there is a separate hidden 'Scythian model' which has no relation to the idea of 'Asian despotism'. Hartog completely ignores this. However, I also believe that both 'Persian models' are more complex semantically.

[12] Herodotus, *The Histories* 4.3 [4].

[13] Earlier, in a similar vein, attention has already been drawn to the opposition of despotic Persian and democratic Greek traditions of demonstrating power, commanding of the army, etc. – so-called 'Persian naturalism' and 'Greek idealism' (Provencal 2015: 21, 23, 54, 128, 208–10). In this regard, as the inversion of the 'Scythian model', traced by Herodotus, is curious: the Persians are invading from 'their' Asia into the 'foreign' Europe (cf. Sinitsyn 2017: 157, with bibliography) and the Scythians, on the contrary, returned from 'foreign' Asia to 'their' Europe. Paradoxically, in the eyes of Herodotus, the 'European barbarians' — the Scythians, appear to be, by the 'fairness' of their actions, much closer to the Greeks, who defended their land from the hordes of the 'Asian barbarians', the Persians, although Scythians were much closer to Persians culturally. However, at the climax of their 28-year rule in Asia, Herodotus describes the Scythians negatively: 'the Scythians were rulers of Asia, and by their unruliness and reckless behavior everything was ruined' (Herodotus, *The Histories* 1.106). Here the question, connected with an old and still unsolvable problem for historians and archaeologists, inevitably arises: where did the Scythians come from? This is the question of the relationship between 'the Scythians' Asia', from which they invaded the Black Sea steppes, displacing the Cimmerians, and 'someone else's' Asia, which was ruled by the Scythians for 28 years. Apparently, Herodotus distinguished them not only geographically, but also 'mentally'.

[14] Compare, for example, with the plot about Xerxes crossing the Hellespont, which he carved out for the destruction of the erected bridge (Herodotus, *The Histories* 7.35), where the first 'Persian model' is revealed, with the Scythian victory over the sons of slaves. Both plots tell about the need to overcome the water barrier. However, Xerxes intends to commit a 'misdeed' — to conquer Europe, to seize foreign lands. The Scythians, by crossing the dyke dug by the offspring of slaves, do 'a good deed': they return their own land. We see a kind of inversion here. In both cases, the whips/lashes/scourges appear, but the result of these 'borderline' actions for Herodotus is reasonably different (as well as their motivations): Xerxes was defeated and fled, and the Scythians returned their native land. In this case, the sympathies of Herodotus are obvious. Regarding the *moralité* of Herodotus, see, for example: Lateiner 1989: 129, 262, references 8–9. The topic of overcoming and violating boundaries has an extensive historiography in ethnography, folklore studies and classical philology. See one of the newest works which partly summarises the historiography on this subject: Sinitsyn 2017, especially 156–60.

I was forced to pose these questions when I found some parallels between the text of Herodotus and the religious writings of Zoroastrian (Avesta) and Vedic traditions (Atharvaveda, partly Ṛgveda). Below I will attempt to answer these questions and, as a result, offer a new interpretation of this well-known fragment from the history of Scythians.

A broad dyke dug from the Tauric mountains to the lake of the Maeotis apparently could be filled with water, since the text implicitly indicates its connection with the lake. However, even in this case, it is doubtful that it could become a real obstacle for the troops that 'had dominated Asia for twenty-eight years', regardless of what we would mean here by 'Asia'. It seems that there are at least two other meanings of the dyke that ask for our attention: a dyke (or lake) as a symbolic border, on two sides of which the opposing characters are situated, a topographical determinative; a dyke (dry or filled with water), as symbolic, but thought to be quite a real border between two worlds, a cosmogonic determinative.[15]

In the hymns of the Avesta there is evidence for both readings. In the first case, we can recall the battle of Tishtriya in the form of a beautiful white horse with Deva Apaosha in the form of a terrifying black horse which takes place over several days on the coast of the Vorukash sea. I emphasise that the victory of Tishtriya becomes possible only after the prayers in his honour were offered.[16] In the second case, an analogue of 'separating the land' with the help of a dyke could be seen in Yima's actions, dictated to him by Ahura-Mazda, during the construction of Var: he 'crushed the earth with a stamp of his heel, he kneaded it with his hands, as the potter does when kneading the potter's clay'.[17] Here we can also see a motif of land transformation by building border-fence facilities.[18]

Thus, this episode may be seen as a description of a particular ritual, namely the ritual of demarcation and appropriation of 'their own' land.[19] Arnold van Gennep mentions a number of motifs associated with a dyke or a natural water border, of which the following is particularly relevant: a dyke that limits an area of the land thus making it 'owned by a specific group of people'.[20] The place where this ritual is performed can be described as a border space or a space of contact between 'one's own' and 'someone else's'.[21]

Secondly, the 'sage' Scythe gave a piece of advice which could be perceived as unexpected by an external observer like Herodotus. This character can hardly be interpreted as an embodiment of some general image of a resourceful, sharp-witted young man. His advice is the final and fatal mean of salvation, the value of which is obvious to all the Scythians: there is no record of soldiers' objections in the plot. The result was an expected victory. Who could give such advice? I suppose that he is not an ordinary warrior, nor a leader of soldiers. If this were the case, his name would become eponymous for the entire plot under consideration (compare it with 'the cauldron of Ariantas', 'the wisdom of Anacharsis', etc.). Since we do not know the name of this 'resourceful' man, and his advice was accepted without discussion, it should be assumed that this character could only belong to the class of priests: the part of Scythian community that was well-acquainted with the norms of ritual practice, although it is important to bear in mind the question of whether the separate 'class of priests' ever really existed in Scythian society.[22]

It was the whip, decorated with gold, which Ahura-Mazda gave to Yima in order to 'nourish, and rule, and watch over thy world'.[23] In the Avesta, whips, including sacred ones, are frequently mentioned in connection

[15] See the previous reference for the meaning of rivers and lakes as borders in antiquity.

[16] Avesta. Tishtrya [Tishtar] Yasht [Yasht 8], VI. English translation: Malandra 1983: 143–49; in Russian: Rak ed. 1998: 253–59, 268–69. An interesting analogy to Scythian and Avestan stories about the battle, the horses and the whip appearing in it, can be found in the Nart saga: Aysan's locus of travel to fighting mountains in order to get the magic tree for Soslan's wife (Dumezil' 1990: 47).

[17] Avesta. Wīdēwdād. Fragard 2. Myths of Yima [Jamshed], 31–32. English translation: Darmesteter 1898: 18; in Russian: Steblin-Kamensky 2009: 165–66.

[18] In this regard, it is worth paying attention to the interpretation of a dyke dug by the sons of slaves, which is found in some texts, not only as an artificial dyke or a natural water (sic!) barrier like Perekop, but also as real fortification walls in the Kerch peninsula (Dovatur, Kallistov and Shishov 1982: 204–205, reference 113). In this case, it connects the construction activity of the sons of slaves and that of Yima.

[19] Coming back to the topic of water barriers as physical and mental boundaries between worlds, it would be appropriate to recall another story mentioned by Herodotus, namely, the construction of canal by Xerxes (Herodotus, *The Histories* 7.22–24). The king ordered to dig out a canal for the passage of ships, aiming to separate Athos from the rest of Greece by turning it into an island: 'men of all nations belonging to the army worked at digging, compelled by the lash; and then went to the work regularly in succession: more over those who dwelt round about Athos worked also at the digging' (Herodotus, *The Histories* 7.22). We see here a peculiar inversion of the 'Scythian model': the dyke and the whip appear in one plot. However, the obviously 'unfair' power of Xerxes and 'unfair' activities of his troops, aimed at seizing of the foreign land, are strangely accompanied by immediate 'unfair' punishment: the soldiers who act according to the king's will receive the strikes of the whips. The predilection of Xerxes for using whips deserves a separate consideration, as often, contrary to the prevailing opinion (see reference 6), it was beyond the logic of Oriental despotisms (compare with Hellespont scourging).

[20] van Gennep 2002: 20.

[21] See Sinitsyn 2017: 156–57.

[22] See the analysis of this issue in Dumezil' 1990: 132–60. I indicate only this generalizing work of Dumezil' to point at the existing problem and avoid an extensive discussion about the social structure of Scythian society and the question of existence of the 'class of priests'. I think that in the context of the subject being examined it deserves to be the subject of further research.

[23] Avesta, Wīdēwdād. Fragard 2. Myths of Yima [Jamshed], 4–6 (English translation: Darmesteter 1898: 11–12; Russian: Steblin-Kamensky 2009: 162–63).

with priestly functions, rituals and punishments.[24] Moreover, it is precisely this form of ritual equipment, the 'horse whip that "makes obedient"', that is regularly mentioned as the main mean of punishment for wrongdoing.[25]

An epithet of a horse whip, '*sraošō.čaranā-*',[26] directly refers to punishment of the disobedient and fighting devas. Through the image of Sraoša's[27] cudgel, this also refers us to the *vajra* of Indra, who in one context is characterised by the 'swiftness of crossing-waters god'.[28] Now it is necessary to recall the need to cross the water obstacle that we mentioned, not only in the 'Scythian model' in the *Histories* of Herodotus but in both 'Persian models',[29] which is no less interesting. In the Atharvaveda, in the hymn 'To the honey lash',[30] which praises the lash of the Aśvins, the lash is 'a cosmic force that gives all good to man'[31] and correlates with thunder and lightning, as well as the sky.[32] I would also like to emphasise that in Indo-Iranian tradition the whip, especially the horse whip, is often directly connected with the gods supporting world order. In Ṛigveda, the brilliance of the gilded throne column on which stands the dominance of Mitra-Varuna, who guards the universal order, is compared with the 'flashing of the whip' in the sky.[33]

Thirdly, it should be noted, following some of the commentators of Herodotus,[34] that 'the imprint of slave-owning ideology' in the locus of Scythian history is an inaccurate Greek transcription of an etymologically alien, although morphologically similar, plot.[35] This seems to be connected with the story of fighting evil forces (the offspring of slaves), treason and breach of contract. This battle aims to recreate the balance of the world and the victory of good forces (warriors who returned from the campaign to their homeland). Thus, the logical flight of the enemy is not a manifestation of their 'slave consciousness', suddenly awakened at the sight of the whip used as an instrument of oppression. It is instead the fatal and predictable effect of using divine weapon against evil forces: 'the horse whip that makes them obedient',[36]

Finally, in the fragment of Scythian history being considered the use of horse whips is aimed at simultaneously solving two problems: overcoming the enemy that cannot be conquered with conventional weapons and getting back their native land. As it was demonstrated above, the horse whip functions here as an instrument of divine providence. Is it possible to identify its deity? In the Avesta, Mihr Yasht contains the following:

> 112. 'We worship Mithra . . ., whose spear (?) is of silver, whose armor (?) is of gold, ***driving with whip***, the powerful,
> swift, broad-shouldered warrior. Brilliant are Mithra's courses as he
> comes to that country where he is treated well. Wide are (their) valleys
> for (protected) pasturage (so that) now their own cattle and men go
> about freely.
> 113. 'Then may he come to help us. O exalted Mithra and Ahura, when
> ***the whip cracks*** and the horses neigh, ***the whips lash***, the bowstrings
> twang (?) (and) the sharp arrows dart (?), then ***the evil sons*** of those
> who have offered viscid libations, ***having been struck, will go down writhing***[emphasis added].[37]
> 114. 'And so, grass-land magnate Mithra, may you give us
> strength for our teams, health for ourselves, much watchfulness against antagonists, ability to strike back
> at enemies, ability to rout lawless, hostile opponents!'[38]

There is no doubt that, in this quote from Mihr Yasht, we encounter the quintessence of the plot: a brief but clear hint at the fact of betrayal, breach of contract and divine punishment for this crime. Herodotus will later develop this into a separate larger story in the history of the Scythians. With high probability we can assume that the victory of the Scythians over the offspring of their slaves took place thanks to Mithra, the guardian of concord and world order. This victory revealed the power of his weapon (the horse whip) against sinners and

[24] Dumezil' 1990: 134; Avesta, Wīdēwdād. Fragard 13. [The Dog] (English translation: Darmesteter 1898: 155–69; Russian: Rak ed. 1998: 113–18).
[25] Avesta, Wīdēwdād. Fragard 3 [The Earth], 36–37; 13 [The Dog] (English translation: Darmesteter 1898: 32, 155–69; Russian: Rak ed. 1998: 91, 113–16).
[26] See the reference 5, especially Darmesteter 1898: lxxxiii, reference 6.
[27] Darmesteter 1898.
[28] Elizarenkova 1999: 161. Compare with the whip or scourge as a weapon of Grom [Thunder], in the folklore-mythological motifs of Eurasia (Berezkin n.d.).
[29] See above and reference 19.
[30] Atharvaveda 9.1. English translation: Griffith 1895: 427–30; in Russian: Elizarenkova 2007: 46–49, 222–23.
[31] Elizarenkova 2007: 222.
[32] Which, in my opinion, is also a reference to Indra's main weapon, the *vajra*.
[33] Elizarenkova 1999: 120.
[34] Dovatur, Kallistov and Shishov 1982: 205.
[35] Compare with the story of the battle between Argos and slaves (Herodotus, *The Histories* 6.83).
[36] Compare with the punishment for various crimes prescribed in the Avesta in form of tens, hundreds and thousands of horse whip strikes, depending on severity of a crime. See references 5, 25, 26.
[37] Avesta, Mithra [Mihr] Yasht [Yasht 10]. XXVII. 112–13 (English translation: Malandra 1983: 72; Russian: Rak ed. 1998: 300–301); compare Gershevitch 1967: 129–31.
[38] Avesta, Mithra [Mihr] Yasht [Yasht 10]. XXVII. 114. Gershevitch 1967: 131.

treaty-breakers,[39] who wished to take away from the Scythians part of their native land.[40]

The use of the whip during the expansion of the inhabited land, in this case when the lost or illegally detached land is taken back, also has direct parallels in the Avesta. Yima expands the territory with the help of his whip by striking the land three times until it reaches the desired size and has enough space for both cattle and people.[41] Now, after we have given the answers to the questions asked above, this well-known locus of Scythian history can be interpreted in a different way: it is possible to see the plot in the light of its probable Avestan sources. The particular story about life and adventures of the offspring of the Scythian slaves must remain a kind of syntactic scheme. The meaning of the plot, copied with precision by Herodotus, will get clearer: it represents the eternal battle between the forces of chaos and order and the triumph of justice made with help of Indo-Iranian deity Mitra-Varuna or Avestan Mithra.

Addendum

> '... I AM A FRIEND TO WHAT IS RIGHT,
> I AM NO FRIEND TO WHAT IS WRONG ... '

In this paper I have advanced a hypothesis explaining the semantics of the horse whip and the pragmatics of its use in the 'Scythian model' of Herodotus. Now it would be appropriate to return briefly to the 'Persian models', also discussed above, and I would venture to advance a paradoxical, yet promising, assumption in the context of this material. In most cases where the king, in this case Xerxes, gives an order to use whips for an inexpedient 'punishment' or excessive 'stimulation', or they are made with his knowledge, this is not a manifestation of typical Oriental 'despotism' or 'Asian barbarism', as Herodotus apparently perceived it, and followed in the Hellenocentric tradition of Classical studies.[42]

I suppose that Herodotus recorded something that he could not explain, either personally or to his descendants, namely the practice of rituals associated with the cult of Mithra, the deity of concord[43] and world order, which were widespread across Asia. There are at least two cases where Herodotus implicitly records the religious views of Xerxes: he honours Mithras, making a libation in his honour after sunrise,[44] or before the beginning of military actions (compare with the libations made before crossing the Hellespont); he also honours Ahura-Mazda and launches his sacred chariot ahead of his troops.[45] Based on the characteristics of the king's behaviour, described by Herodotus essentially as ὕβρις or exaltation, it is possible to assume that Xerxes either assumed or wished to take on some of the divine functions, becoming a sort of 'shadow of Mithra on Earth'.[46] The commentators of *The Histories* emphasise that 'Xerxes was seen as a super-human divine being' and, according to the testimony of Xanthus of Lydia, 'Xerxes declared himself the "saviour" of the world from evil and distemper, who establishes a new order in the world'.[47] This can be interpreted in a religious context as an acknowledgement of assuming the functions of god, in this case Mithra, on earth. If we consider this assumption to be correct, then the punishment of the disobedient by whipping on the will of the king of the Hellespont (i.e. Mithra)[48] no longer looks like a manifestation of the ὕβρις of the Persian ruler but instead appears to be a fair act of retribution executed according to the will and on behalf of higher powers (in this case, Mithra). This is the first 'Persian model' of using the whip or lash.

In the same way, the second 'Persian model', the 'excessive' (from the Greek point of view) stimulation of the Persian army by the blows of scourges, can be interpreted as using the 'sacred weapon' to overcome 'unfaithful' enemies and expand the inhabited lands.[49]

[39] Compare Avesta. Mithra [Mihr] Yasht [Yasht 10]. XXVII. 67, 68) (English translation: Malandra 1983: 66–67; Russian: Rak ed. 1998: 288).

[40] Compare with the symbolism of the burial of the 'golden man' in the Issyk kurgan, which A. Akishev figuratively calls 'a shadow of ... Mithra ... on Earth' (Akishev 1984*a*: 4, 122 and in which a whip adorned with a gold lining was discovered); it was an essential grave-good for upper-class individuals in the Scythian period.

[41] Avesta, Wīdēwdād. Fragard 2. Myths of Yima [Jamshed], 4–19 (English translation: Darmesteter 1898: 11–14; Russian: Steblin-Kamensky 2009: 162–64).

[42] The specifics of Greek perception of the Persians and their customs by Herodotus was already mentioned (Provencal 2015: 159–60): he also writes about the 'isolation' of the Ahura-Mazda cult and its ideology (primarily related to the royal power) in the Persian empire, believing that this was the reason for the lack of any intelligible information about the religion and pantheon of the Persians.

[43] The indirect proof of the veneration of Mithras by the Persians could be an indication of Herodotus (*The Histories* 1.138) that the Persians consider the lie to be the most disgraceful act. As a god, Mithra is fighting against untruth: see Malandra 1983: 56, cf. the title of this addendum with the quote from the inscription honouring the perfect king Darius (Xerxes) (Provencal 2015: 159).

[44] The connection of Mitra/Mithra and the sun was well demonstrated in the Indo-Iranian tradition: see Malandra 1983: 58; Rak ed. 1998: 269–70.

[45] Herodotus, *The Histories* 7.40, 54, 55 (Utchenko ed. 1972: 327, 330, 534, references 43, 48; 539, 167); cf. the car of Mitra-Varuna in Atharvaveda (Atharvaveda, 4.29.7), 'straight-reined car that keeps the track of goodness assails and ruins him who walks perversely' (Griffith 1895: 171); see reference 39 in this paper.

[46] The nature of the power of the Persian kings (the Achaemenids) is examined in detail by Provencal (2015: 152–60). However, how far the supposed self-identification went and whether it was perceived in a similar way by the population, 'the Persian people', is still difficult to understand from the text of Herodotus.

[47] Cf. the image of Xerxes crossing the Hellespont, who, in the eyes of a local resident, who called him 'Zeus', acts as an almighty god (Herodotus, *The Histories* 7.56) (Utchenko ed. 1972: 534, reference 49).

[48] What is important here is that both Mithra and Ṛgvedic Indra have the ability to regulate the saturation of space with water, taking special care of rivers and lakes (Malandra 1983: 57).

[49] See the frequent epithet of Mithra as 'possessing wide pasture land' (Malandra 1983: 58), which also refers to the expansion of inhibited space.

We encounter it during the crossing of the bridge over the Hellespont, which marks the official beginning of the military campaign in Europe,[50] in digging a canal through the Athos Isthmus which illustrates the seriousness of Xerxes's intention to seize Greece[51] and, finally, in the occupation of Thermopylae, this victory over the Spartans led by king Leonidas – 'the most famous royal family' – foreshadowing the rise of Xerxes as the invincible ruler.[52]

The fact that Xerxes could think of the conquered territories as 'his own', in accordance with 'divine providence' and generally considered his mission to be the 'establishment of order and peace on earth' – i.e. embodying thereby the prerogatives of Mithra – also explains his 'barbaric' act with the body of king Leonidas. In this case, Xerxes perceived Leonidas not as a personal enemy, but as an 'evil demon' opposing the establishment of the highest will of the deity, that the Persian king implemented: 'What is right, that is my wish. I am no friend of the man who is a follower of the lie'.[53]

Finishing this brief panorama of 'life and adventures' of the horse whips and scourges in the *Histories* of Herodotus, I can now clearly hear the whistle of the whips of the old Iranian world that fly up and fall down as accompanied by a loud assured chant:

> 'Because of his rayi and glory, I shall audibly worship Mithra of wide
> pastures with libations. We worship Mithra of wide pastures, who bestows
> peaceful and comfortable dwellings on the Iranian countries'.[54]

[50] Crossing the Hellespont (crossing the border between the 'owned' and 'foreign' world) is preceded by a thorough preparation, including ritual acts and offering prayers (Herodotus, *The Histories* 7.53–54). Where Herodotus describes the very moment of the crossing, we find the inversion of the 'Scythian model' of using whips as a divine tool described above. Here the army of Xerxes moves under the blows of scourges. Against whom are these whips directed?

[51] Herodotus, *The Histories* 7.22–24; Utchenko 1972: 534, reference 29. See reference 19 in this article.

[52] Herodotus, *The Histories* 7.209, 223. It is significant and important that in the case of the victory over the Spartans at Thermopylae, we see a direct (not inverted!) and syntactically similar implementation of the 'Scythian model'. The battle takes place at the border between 'their own' territory and 'foreign' land, which remains ruled by the Hellenes. The important motif of water barrier is also implicit here: Herodotus carefully describes several rivers that flow at the foot of Thermopylae or in the gorge (Herodotus, *The Histories* 7.198–201). The troops of Xerxes repeatedly attack the Spartans, but they cannot win and suffer defeat after defeat (Herodotus, *The Histories* 7.210–12). A traitor offers Xerxes a solution: use the secret path in Thermopylae (Herodotus, *The Histories* 7.213–18). However, Xerxes made a complete and unconditional victory over Leonidas and his army only after 'having made libations at sunrise'. He did not do this before the previous attacks on the Spartans (!), and afterwards 'the leaders of the divisions with scourges in their hands were striking each man, ever urging them on to the front' (Herodotus, *The Histories* 7. 223). Thus, the scourges symbolising the power of Mithra were the reason for a fair victory (from the perspective of Xerxes and the Persians) over the Greeks, in the process of establishing of a world order, not world domination.

[53] Provencal 2015: 159.

[54] Avesta, Mithra [Mihr] Yasht [Yasht 10]. I. 4 (English translation: Malandra 1983: 59; Russian: Rak ed. 1998: 271).

Testing Herodotus: leather species identification of Scythian quivers using new scientific methods

Luke Spindler,[1] Margarita Gleba,[2] Marina Daragan,[3] Matthew Collins[4]

Abstract

Scythian archers are invariably depicted carrying a quiver in ancient iconography and the ancient Greek historian Herodotus wrote of Scythian archers flaying the right arms of their dead enemies and using the skin to cover their quivers, yet little is known about the construction and materials of Scythian quivers. The survival of numerous fragments of leather quivers excavated from Scythian burials in southern Ukraine and recently developed analytical methods finally provide the possibility of investigating the material used to make this indispensable element of Scythian military equipment. We used Scanning Electron Microscopy (SEM) and Zooarchaeology by Mass Spectrometry (ZooMS) to test 38 fragments of decorated leather quivers from ten kurgan sites in order to reveal their species identity. In this paper we present the methods and results of our investigation and attempt to answer the question: what material did the Scythians use to make their quivers, and was Herodotus correct in his grisly claim?

Keywords: European Scythians; leather quiver; leather species identification; SEM; ZooMS; Herodotus

Introduction

Herodotus, although often regarded as 'the father of history', reported several remarkable stories in his *Histories*, the most exotic of which have undermined his reputation as a historian. However, many of the reports he provided do seem to have a factual basis and archaeology has confirmed some of his more incredible claims.[5] One of these is that of Scythian archers flaying the right arm of their enemies and using the skin as a covering for their quivers as follows:

> 'A common practice as well is to take the corpse of an adversary, to skin the right hand, fingernails and all, and then to make it into a cover for an arrow-sheath. (Human skin, it turns out, is thick and has a tremendous sheen, more brilliant, and whiter, than almost any other kind of skin). There are also many Scythians who will flay men entire, and stretch the hides on wooden frames, which they then carry around with them on their horses'.
>
> Herodotus, The Histories 4.64.

The quiver or arrow bag fulfilled multiple important functions for the Scythian archer. It had to provide the secure storage and transportation of a large number of arrows, and at the same time served as an indicator of not only the status but also likely the ethnicity of the owner.[6] The terms quiver and *gorytos* are used interchangeably in the literature for describing an item for carrying an archer's arrows yet the *gorytos* was a case for carrying both the arrows and a bow whereas quivers were simply used for carrying arrows. The different terms (φαρέτρα and γωρυτός) are encountered in Homer's *Odyssey*[7] and are also distinguished by Herodotus himself.[8]

Almost every Scythian burial is accompanied by a quiver set, although usually only the arrowheads survive.[9] The

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[5] For example, the recent re-investigation of one of the four largest royal Scythian kurgans in southern Ukraine, the Aleksandropol mound, led to the discovery of a large funerary feasting area in the immediate vicinity of the kurgan and, within it, 11 accompanying burials of men, women and children, all of whom appear to have been killed and buried there as part of the funerary rites for the royal occupant of the burial mound (Polin and Daragan 2011, this volume): these details closely correspond to Herodotus' description of a Scythian king's funeral (Herodotus, *The Histories* 4.71–72). The issue of human sacrifice as part of Scythian funerary ritual is discussed separately by Daragan (2017*a*: 115–18).

[6] Daragan 2016*b*: 112. While for the time being there is insufficient information regarding construction differences between different Scythian quivers, they clearly differ from earlier examples found in the Near Eastern contexts and depicted in Assyrian and Achaemenid iconography; see Szudy 2015: 110–16, who suggests that sculptors likely employed differences in military equipment, including quivers, to indicate the ethnicity of the figures depicted on the Assyrian reliefs.

[7] Homer, *Odyssey* 9.314, 21.54.

[8] Herodotus, *The Histories* 4.64.

[9] Daragan 2017*a*; this volume.

Figure 1. A warrior with a quiver hanging over his left thigh from golden helmet found in Peredriyeva Mogila kurgan 2, near Zrubne village in the Donetsk region of Ukraine, dated 4th century BC (image: D. Klochko, © National Museum of the History of Ukraine)

numbers of arrows in an archer's set varies but they have been found to contain as many as 200 or more.[10] Quivers also play a major role in Scythian iconography. On ancient Greek vase painting, Scythian archers are invariably depicted with quivers which must have constituted an integral part of their outfit.[11] This is also mirrored in the images that Scythians produced of themselves, such as the anthropomorphic stone stelae from Erdelivka, Kirovograd, Vinogradovka, Ternovka, Plavni, Zolotaya Balka, etc. (Figure 2),[12] as well as many representations on the toreutic art, for example on the helmet from Peredriyeva Mogila (Figure 1) or the pectoral from Tovsta Mogila.[13] Metal plating elements of ceremonial *gorytoi* have been found in numerous 4th century BC Scythian burials from Ukraine[14] and elsewhere, such as the famous example in the so-called Philip's tomb at Vergina in Macedonian Greece.[15] An example from Soboleva Mogila provides clear evidence that the plating was directly attached to an organic substrate, which has mostly disintegrated (Figure 3).[16] However, until the present study little was known about the nature of the materials used for the manufacture of more mundane examples of Scythian quivers, since organic materials rarely survive in a well preserved state in the steppe burials of southern Ukraine.

Material

A recent re-examination of quiver sets excavated in southern Ukraine identified numerous preserved examples of leather and wooden parts of the quivers. The information regarding their provenance, context and dating is summarised in Table 1.

At Bulgakovo, the quiver was recovered as a block, preserving the various components including arrows *in situ* (Figure 4a). This important find allows us to reconstruct the basic structural elements of a leather quiver which in its basic form consists of a leather case with two compartments and a cover, sewn together with a durable vegetable tanned leather. There are various external, internal and intermediate parts. The main external parts are made up of the front and back walls, the base of the quiver, the reinforcing plates of its lateral wall and base, and the cover. The front wall is simple and usually consists of one piece of leather; in contrast, the back wall is a composite made of various decorative elements. The connection between the front and back walls is reinforced by a plate and forms the base of the quiver. The interior of the quiver contains a partition wall.

Understanding the construction of the Bulgakovo quiver allows us to reconstruct the original appearance of other less complete examples. The vast majority of the material in fact survives in fragments (Figure 4b–e), some of which can be identified as particular structural elements while others are too fragmented to allow such an identification (Table 1). Many pieces preserve decorative patterns that are embossed and/or painted in red, blue or yellow pigment,[17] indicating that leather quivers could be lavishly ornamented without the addition of gold elements.

The fragmentary state of preservation, combined with poor excavation documentation, precludes a detailed contextual analysis in many cases. Nonetheless, this material provides a new opportunity to test Herodotus' claim of the use of human skin and to determine which animal species were used to create the Scythian quivers

[10] Daragan 2017*a*; this volume.
[11] Vos 1963.
[12] Olkhovsky and Yevdokimov 1994; Olkhovsky 2005.
[13] Reeder ed. 1999: 256–61, 326–29.
[14] E.g., Melitopol'; see Reeder ed. 1999: 226–31.
[15] Andronikos 1984: 182–83, pl. 146.
[16] Mozolevsky and Polin eds 2005: 158–59, 168, 170, 171, pls 13, 16. An earlier *gorytos* made of wood and richly decorated with gold was excavated at the 7th century BC kurgan at Arzhan 2 in Tuva indicates that the organic material on this example was likely wood too (Chugunov, Ryabkova and Simpson 2017: 195, 196, 210–11, cats 121–23).
[17] On pigment analysis see Gleba, Vanden Berghe and Daragan, this volume.

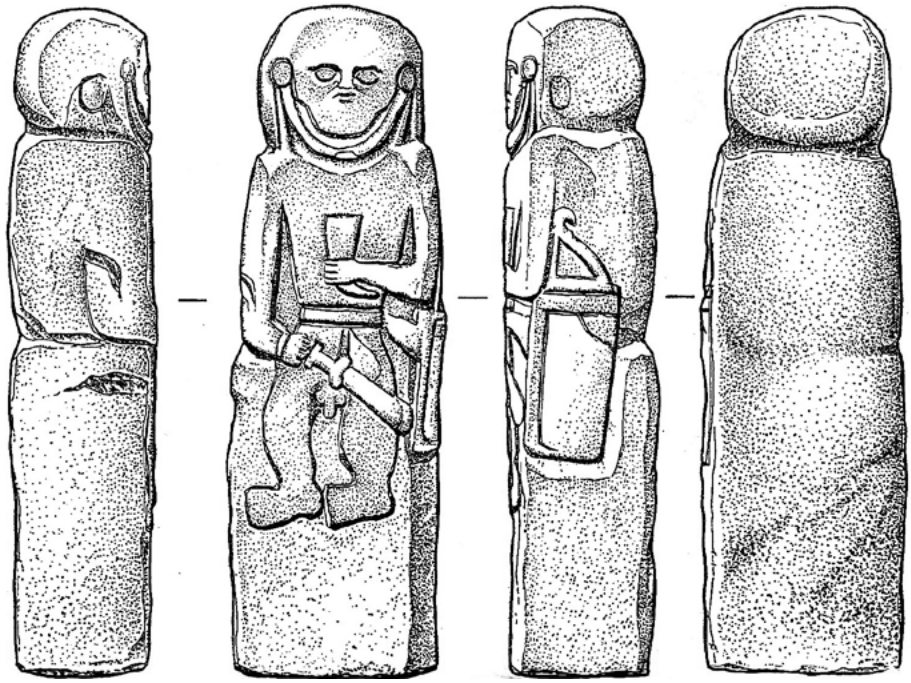

Figure 2. Stone stele of a standing male figure holding a drinking horn, with a scabbard and sword hanging from his belt and a gorytos with bow on the left side, from Plavni kurgan 2, Odessa region, dated to the end of the 5th-early 4th century BC (drawings: G. Yevdokimov; © State Historical Art Preserve, Pereiaslav-Khmenytskyi)

Figure 3. *Gorytos* from Soboleva Mogila *in situ* (photograph: Institute of Archaeology of Ukraine)

in southern Ukraine. Species identification may be useful for our understanding of Scythian animal husbandry and management for the production of leather.

Background

Species identification of skin and leather artefacts has been carried out since the 19th century and using primarily microscopic methods which rely on comparison of the unknown archaeological specimen with diagnostic features observed in reference samples of known species. Skins with preserved pelage are usually inspected visually either macroscopically or microscopically to identify species based on hair morphology and cross section using light and/or scanning electron microscopy (SEM).[18] Recently, this method was used in the identification of fur garments from various Scythian burial sites in the Tuva region of Russia.[19] Species identification of archaeological leather without preserved pelage has been more problematic due to its frequently high level of degradation. In some cases, fibrous structure of the collagen in cross section or the hair follicle pattern, known as grain pattern may be analysed.[20] A sample of the leather boots found in Bulgakovo kurgan 5 burial 2 (the same burial that yielded the most complete quiver included in this study) was determined to be goat skin using optical microscopy.[21] Despite the wide application of hair and follicle pattern analyses, the reliability of species identification can be problematic due to biological variation within species,

[18] Appleyard 1978; Chernova and Tselikova 2004; Chernova *et al.* 2011; Rast-Eicher 2016.
[19] Chernova and Busova 2016.
[20] Haines 2006; Michel 2014.
[21] Plavan *et al.* 2012: 515.

Site	Burial type	Sex	Burial inventory	Quiver remains	Date	Reference
Ilyinka, kurgan 4, burial 2	Secondary burial: burial chamber of catacomb type	Probably adult male	**Nine quivers** with arrows; iron spear heads and butts; iron sword in a wooden sheath; iron cuirass and belt; bronze greaves; bronze cauldron; silver kylix; black-figure kylix; gold torc; pottery fragment; amphora. Extant fragments come from three quivers: no. 5, possibly no. 7 and an unknown one	Separate leather fragments (some painted)	Second-early third quarter of the 4th century BC	Pleshivenko 1987: 58–63
Ilyinka, kurgan 4, burial 3	Secondary burial: burial chamber of catacomb type	Child	**Two quivers** with arrows; iron knives; beads; thin wooden elements, possibly from a bow	Separate leather fragments of the front side (some ornamented and painted) and base	Second-early third quarter of the 4th century BC	Pleshivenko 1987: 63–65
Ilyinka, kurgan 4, burial 6	Secondary burial: burial chamber of catacomb type	Child	Bronze finger rings; beads; black-figure kylix; **quiver** with arrows	Separate leather fragments	Second quarter of the 4th century BC	Pleshivenko 1987: 68–70
Bulgakovo, kurgan 5, burial 2	Secondary burial: burial chamber of catacomb type	Double, probably adult male and female*	Wooden boxes; spindles; pottery; Greek pottery; bronze cauldron; iron knives and spears; beads; earrings; torc; rings; **quiver** with arrows	Large fragments of the leather quiver bag and internal partition; preserved *in situ*	Second quarter of the 4th century BC	Grebennikov 2008: 83
Vodoslavka, kurgan 8, burial 4	Secondary burial: burial chamber of catacomb type	Sub-adult, probably male*	**Quiver** with arrows; bow; bronze finial; iron knives; wooden plate	Separate leather fragments of the front side with one ornamented piece	Beginning of the third quarter of the 4th century BC	Kubishev *et al.* 1983: 80–81
Kairy, kurgan group V, kurgan 1, burial 1	Main burial: oval pit burial	Male, 25-30 years	Wooden dishes; iron spears and finial; bronze greaves; **quiver** with arrows	Quiver base and unidentified fragments of the quiver bag	End of the 5th-first quarter of the 4th century BC	Kubishev *et al.* 1989: 77–81
Olgino, kurgan 2, burial 1	Main burial: burial chamber of catacomb type	Looted (a few bones survive)	Arrowheads; **quiver** fragments; kylix; bronze finial; iron knife and spear butts	Quiver base and unidentified fragments of the quiver bag	2nd quarter of the 4th century BC	Bessonova, Kobalov and Kubishev 2005: 45–47; Polin 2014: 308
Sadovoye, kurgan 4, burial 1	Secondary burial: burial pit	Adult*	Knife; **quiver** with arrows	Unidentified fragments of the quiver bag	Third quarter of the 5th century BC	Yevdokimov *et al.* 1988: 49; Polin 2014: 224
Zolotaya Balka, kurgan 13, burial 7	Secondary burial: burial chamber of catacomb type	Male	Gold earrings and finger ring; two quivers with arrows; iron spear heads, darts, knife; bronze finial; bone and wooden objects; leather vessel; amphora	Upper part of the vessel	Beginning of the third quarter of the 4th century BC	Polin 2014: 76–88

Table 1. Summary of burials which yielded materials analysed in this study

Site	Burial type	Sex	Burial inventory	Quiver remains	Date	Reference
Orehovo, kurgan 3 burial 2	Secondary burial: burial chamber of catacomb type	Double male*	**Three quivers** with arrows; iron spears, belt and knife	Quiver base and separate fragments of the quiver bag, some ornamented	First half of the 4th century BC	Kovaleva and Shalobudov 1993: 22–27
Zelenoe, group I, kurgan 2, burial 3, камера 1	Secondary burial: burial chamber of catacomb type with two chambers	Main male burial	Iron cuirass, hip guards; spear heads and butts, knife; wooden dishes; stool; stone; lekythos; kylix; **two quivers**	Separate leather fragments of the quiver bag	End of the 5th-early 4th century BC	Yevdokimov *et al.* 1983: 51–54
Kislichevatoe, group 2, kurgan 7, burial 1	Main burial: burial chamber of catacomb type		Coral pendants; iron awls; lead weight; arrowhead; embossed **leather fragments**	Unidentified leather fragments	4th century BC	Mukhopad 1989: 75

*Without osteological determination of gender

Table 1. Continued

similarities between related species, and degradation of the pelage itself.[22]

Using a completely different and forensic approach, counter-immunoelectrophoresis has been applied to test for blood, sweat, and saliva in nine leather quiver samples from the 4th century BC Yakovlevskiy burial 2 in Russia, which identified human tissue in one sample.[23] Four of the samples included in the present study were tested using this method. The sample from Kairy did not produce any results while one sample from Bulgakovo and two from Vodoslavka produced positive reaction to proteins from human, avian, canine and (in one sample) bovine sweat. However, this test cannot differentiate between the proteins which form part of the sample and those resulting from a contamination throughout the long life history of the object. The method is thus unsuitable for archaeological leather species identification.

In recent decades, ancient biomolecules have become a useful resource for investigating organic material. DNA has been used for species identification although the success of this approach depends on the level of its preservation.[24] This is dependent on the diagenetic conditions that artefacts and material are preserved under during archaeological deposition or, in the case of leather, the tanning process prior to deposition. More recently an alternative molecular approach for species identification has been developed, using mass spectrometry to analyse collagen extracted from animal derived materials (e.g., bone), called Zooarchaeology by Mass Spectrometry (ZooMS).[25] This is applicable to skin as collagen is one of the most abundant proteins present in the tissue, playing an important structural role.[26]

Methods

All samples were observed in the SEM in an attempt to use morphological features such as grain pattern or possible surviving hair to identify the species. We have applied ZooMS as a complementary technique to SEM analysis. 38 fragments were analysed in total and originate from 11 burials. In addition to the quivers, one fragment from supposed trousers and one from a leather vessel were also tested. Those quivers that were sampled multiple times had the samples taken from different elements to test for differences in structural materials.

SEM

The samples were analysed using Hitachi TM3000 TableTop Scanning Electron Microscope at 30x, 100x,

[22] Brandt *et al.* 2014.
[23] Fedorov and Gorshkova 2001.
[24] Vuissoz, Worobey and Odegaard 2007.
[25] Buckley *et al.* 2009.
[26] Michel 2014.

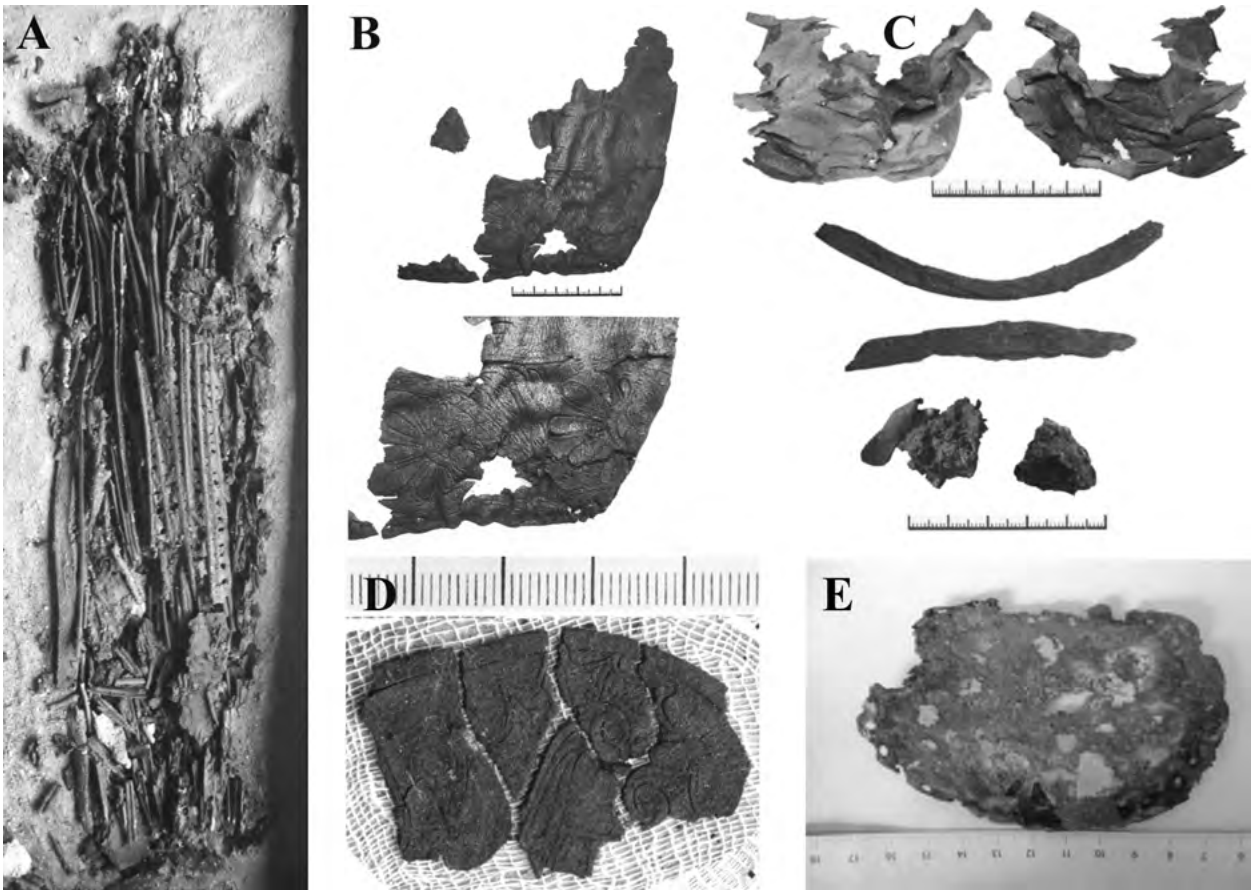

Figure 4. Images of some of the quiver leather sampled, showing different levels of fragmentation and preservation; A) Bulgakovo kurgan 5 burial 2, B) Ilyinka kurgan 4, burial 3, quiver 2, C) Orehovo kurgan 3, burial 2, D) Vodoslavka kurgan 8, burial 4, E) Olgino kurgan 2, burial 1 (all photographs: M. Daragan)

200x, 400x and 1000x magnification. The following instrumental settings were used: analytical condition mode at 15.00 kV accelerating voltage, compositional imaging and working distance of 5-10 mm. The samples were not coated.

ZooMS

Collagen was extracted by adapting the method described in Buckley *et al.* 2009. Each fragment was subsampled by taking a small, ~1 mm^3, piece using a pair of tweezers and placed in a 1.5 mL microcentrifuge tube (Sarstedt). These subsamples were rinsed once with 200 µL 0.1M NaOH to remove humic acids,[27] followed by a further three rinses in 200 µL 50 mM pH8.0 ammonium bicarbonate until a neutral pH was reached. A further 50 µL 50 mM pH8.0 ammonium bicarbonate was added to the rinsed subsamples, and incubated overnight (approximately 18 hours) at 37°C with 1 µL of 0.4 µg/1 µL trypsin solution (Promega) to digest the collagen protein into peptide fragments. Enzymatic digestion was terminated with 1 µL 0.1% TFA after centrifuging at 13,000x*g* for 1 min. The digests were purified using C18 ziptips (Pierce Thermo Scientific), following the manufacturer's procedure. 1 µL purified digest was spotted onto a 384 target Bruker Matrix Assisted Laser Desorption/Ionisation (MALDI) plate, with 1 µL α-cyano-hydroxycinnamic acid and allowed to crystalize before analysis. MALDI analysis was performed using a Bruker Ultraflex II using time of flight mass separation in reflector mode. Spectra were acquired over a *m/z* range of 800-4000.

ZooMS species identification

Spectra were inspected manually, using mMass, and compared to the peptide marker sets for all available species.[28] These markers correspond to particular peptides that can be seen in the spectra. Some species can be identified on the basis of single, unique, peptides while others can be identified on the basis of a combination of markers. For example, Physeter microcephalus can be identified based on the presence of 2133.1 for peptide marker D, while an identification of *Rattus rattus* requires the presence of 1105.6 for marker P1, 1453.7 for marker B, and 2142.1 for marker D.

[27] Malcolm 1976.

[28] Buckley *et al.* 2009; 2014; Kirby *et al.* 2013.

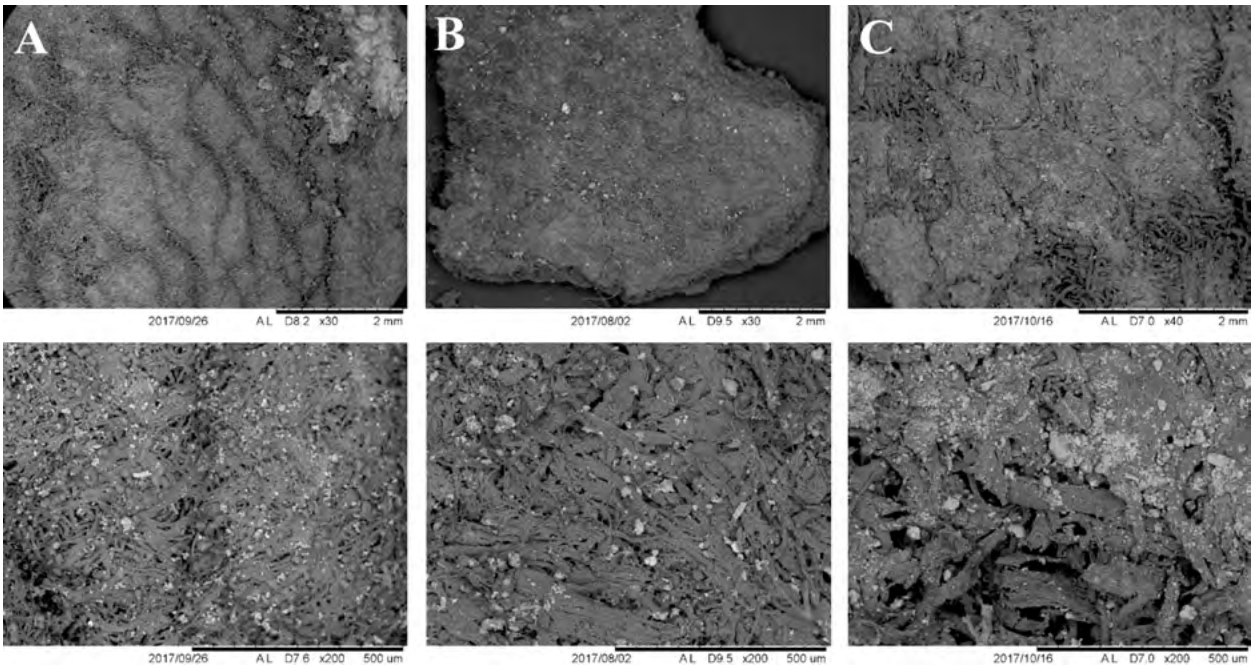

Figure 5. SEM images of the remaining surface of three leather fragments, top row at x30 and bottom row at x200, A) Ilyinka kurgan 4, burial 3, quiver 2, B) Vodoslavka kurgan 8, burial 4, C) Ilyinka kurgan 2, burial 4 (images: M. Gleba)

Some closely related species, for example *Felis catus* and *Lynx lynx*, cannot be differentiated as all known markers are identical resulting in a more generic identification, such as 'carnivore'. Any spectra failing to be more specific than this were not given an identification.

Results and Discussion

SEM

SEM analysis of the material did not produce any species identifications. The pelage and skin surfaces had been completely degraded, likely due to scraping and tanning of the skin during its preparation. Wear during use, and post-depositional processes can also be reasons for the loss of the surface. The evidence of this can be seen in Figure 5: no diagnostic features are evident, with only the corium visible, while the epidermal tissue has been removed.

ZooMS

A positive identification was obtained for 55% (21) of the tested fragments. In cases where multiple fragments from a single artefact were analysed, some produced results while others did not.

The species identified are largely domesticates, over half of the identified species were either sheep or goat (Figure 6), and one example of cattle. Also, three fragments were narrowed down to being from either the *Bovidae* or *Cervidae* families, though a more specific identification could not be made.

The two remaining identifications stand out as non-domesticated mammals. One fragment from Orehovo kurgan 3, burial 2 was identified as a member of the *Carnivora* family where, as stated above, similarities in markers meant that a single species or genus could not

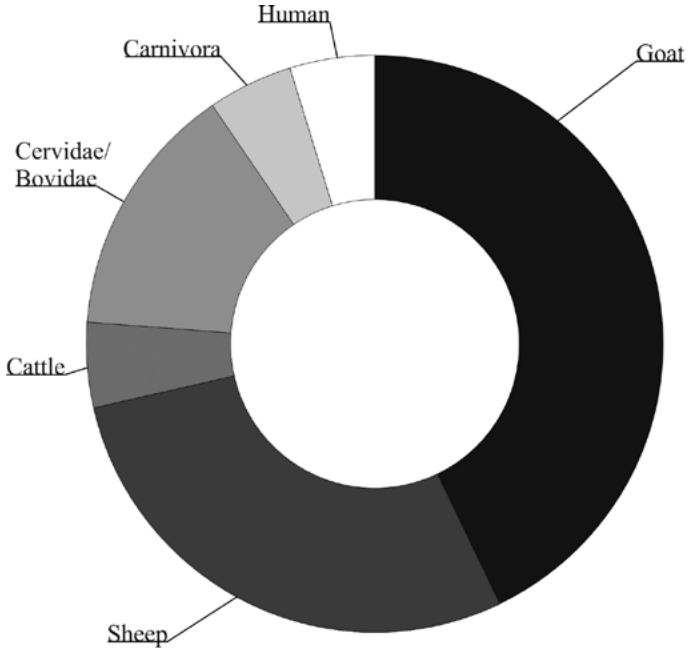

Figure 6. Pie chart displaying distribution of positive species identifications from the tested fragments

Site	Object	Samples	Sample location	Species identifications
Ilyinka, kurgan 4, burial 3	quiver 2	7	various	2 cervid/bovid, 1 goat, sheep, 2 no ID
Ilyinka, kurgan 4, burial 2	quiver	2	undefined parts	1 human, 1 no ID (though not human)
Ilyinka, kurgan 4, burial 6	quiver	1	undefined part	1 no ID
Ilyinka, kurgan 4, burial 2	quiver 5	3	undefined parts	1 goat, 2 no ID
Bulgakovo, kurgan 5, burial 2	quiver	7	various parts	goat
Vodoslavka, kurgan 8, burial 4	quiver	3	front and undefined	goat
Kairy, group V, kurgan 1, burial 1	quiver	1	base	1 goat
Kairy, group V, kurgan 1	clothing or quiver	1	described as trousers but likely quiver sides	1 goat
Olgino, kurgan 2, burial 1	quiver	1	base	1 cervid/bovid
Sadovoye, kurgan 4, burial 1	quiver	1	undefined part	1 no ID
Zolotaya Balka, kurgan 13, burial 7	leather vessel	1	top	1 no ID
Orehovo, kurgan 3 burial 2	quiver 2	4	various parts	1 Carnivore (not bear, wolf or lynx), 1 sheep, 1 cattle, 1 no ID
Orehovo, kurgan 3 burial 2	quiver 3	1	base and side	1 sheep/red deer/fallow deer
Orehovo, kurgan 3 burial 2	quiver 1	1	side	1 no ID
Zelenoe, group I, kurgan 2, burial 3	quiver	3	various parts	3 sheep
Kislichevatoe, group 2, kurgan 7, burial 1	shoes	1		1 no ID

Table 2. Results of ZooMS species identification

be distinguished although bear, wolf and lynx can be excluded. From Ilyinka kurgan 4, burial 2 we identified one fragment as human, the markers for which are considerably distinct from most, wild and domestic mammals in the Eurasian steppe. This goes some way towards corroborating Herodotus' claim cited above, although one fragment out of 38 hardly suggests an extensive practice and indicates this was only used in exceptional cases and was possibly connected to specific aesthetic (e.g. its whiteness as per Herodotus), or mechanical (such as thinness), properties of human skin.

In the case of quivers where multiple elements were analysed it was discovered that there were incidences of both single-species construction and multi-species construction as can be seen in Table 2. That there is no pattern in species usage for different elements between the single-species quiver at Bulgakovo and the multi-species quivers from Ilyinka and Orehovo suggests that there was no strict standardisation of raw materials for quiver production. The reconstruction of quiver 2 from Ilyinka kurgan 4 burial 3 is illustrated here, highlighting the analysed fragments and the individual results (Figure 7). The identified elements come from a range of parts, all decorated but combined across the upper half of the quiver.

It is notable that most of our leather samples come from domestic species, in contrast to the garments and other utilitarian objects made of fur found in Ukraine[29] and Siberia, which are in their majority derived from wild animals such as hare, stoat, sable, squirrel, weasel and jerboa or horse.[30] This may be due to the archaeological bias, cultural preferences or specific properties of leather and fur derived from different species and their suitability for different uses.

We do not currently know whether the quivers were produced by settled craftspeople living within the Scythian sphere of influence. This could be particularly pertinent as leather requires an extended time period for its production due to tanning. In favour of this possibility, the embossed designs used in the decoration on fragments from Ilyinka have a distinctly Hellenic style. Moreover, the Scythians of southern Ukraine owned many materials, obtained through exchange with the Pontic Greeks. Therefore there is a possibility that some of the quivers, as has been argued for much of the toreutic art,[31] were produced in Greek settlements or at least by Greek craftspeople. That said, the prevalence of sheep and goat is perhaps unsurprising as these animals were the staple domestic species of the Scythians and ethnographic studies illustrate how nomads can make skins and leathers themselves.[32]

[29] Hair analysis of two skins preserving pelage from contemporary Scythian burials in Ukraine resulted in a preliminary identification of *Mustelidae* and *Rodentia* families. ZooMS will be performed on these samples to independently confirm the identification. Based on their position in the burial, both objects were assumed to have been used as mirror cases, but Chernova and Busova (2016: 54) note that although a similar function was assumed in the case of multiple finds from the Tuva region, they more likely belong to outer garments.

[30] Chernova and Busova 2016; Polosmak and Barkova eds 2005: 43–61; Stepanova and Pankova 2017.

[31] Meyer 2013.

[32] See for example Thargyal 2007: 89–91 on skin production by Tibetan pastoralists.

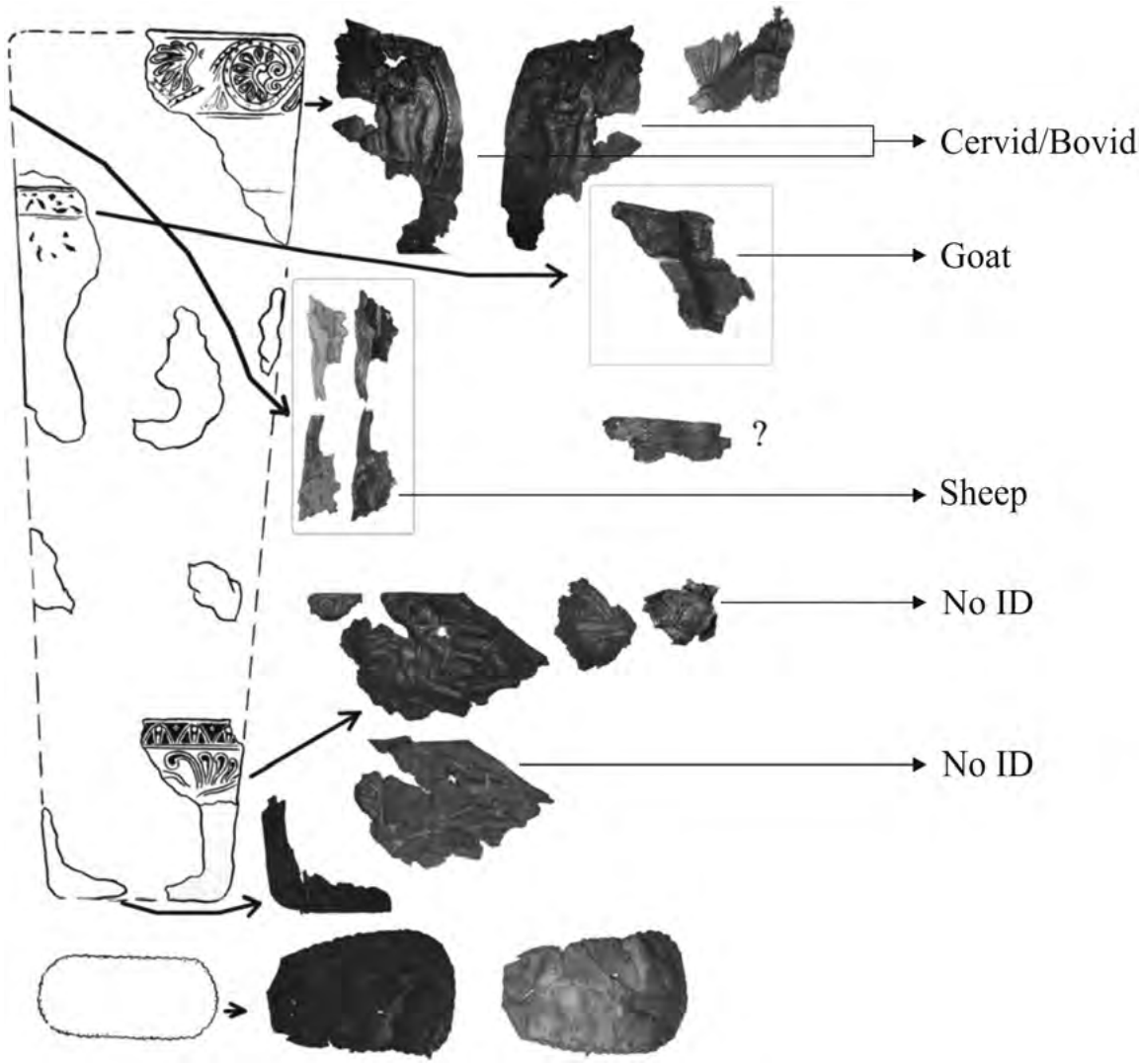

Figure 7. Reconstruction of location of leather fragments from Ilyinka kurgan 4, burial 3 quiver with associated species identifications for fragments analysed (image: M. Daragan after A. Pleshivenko)

Conclusions

The use of ZooMS in this investigation has been particularly useful, providing species identifications where visual analysis was not possible due to the removal of the pelage during leather production and severe degradation of the artefacts. It allowed for the first time to identify a wide range of species, including the closely related sheep and goat, and even distinguish the use of human skin in one case. This would have been harder to achieve using traditional analytical methods.

It would appear that Herodotus was not entirely exaggerating, as has been proved for some of his other assertions, when he claimed that the Scythians were using human skin for their quivers although the extent to which is hard to discern at this stage. The fragment identified as human skin comes from a secondary burial 2 of Ilyinka kurgan 4, dated to the second to early third quarter of the 4th century BC.[33] The burial was relatively rich and its inventory includes nine quivers with 656 arrows, iron spear heads and butts, an iron sword in a wooden sheath, an iron cuirass and belt, bronze greaves, a bronze cauldron, a silver *kylix*, a black-figure *kylix*, a gold torc, fragmentary pottery and an amphora. Leather fragments from three quivers were recovered but the lack of precise documentation from the excavations, which took place several decades ago, make it difficult to better contextualise this intriguing find. The exceptional number of quivers,[34] rich panoply of weapons and other objects suggest that the Scythian

[33] Pleshivenko 1987: 58–63.

[34] In burials of ordinary rank-and-file Scythians there is usually just a single quiver with 15–20 arrows while in burials of the Scythian élite there would often be several quivers with more than a hundred arrowheads. Although burials with two to four quivers are relatively common, only very few have more and these are all royal Scythian kurgans: in the eighth Pyatibratnyi kurgan there were 16 quivers; in Chertomlyk no less than 10 quivers, and in the central burial of the Berdyansky kurgan 11 quivers (Daragan 2016*b*: 113, n. 60).

warrior whom they accompanied into the afterlife was of elite status. We can now say that at least one of the nine quivers included an element made of human skin.

Further work on a greater breadth of material is required to provide a broader understanding of quiver production in the Scythian world. Further testing is also required for additional development of the method, particularly to see if some of the more general identifications can be narrowed down. Investigation on a greater range of material would be worthwhile to examine how common the use of human skin was. Analysis of previously studied material, such as that from the 4th century BC Yakovlevskiy burial 2,[35] would be of particular use if the results from counter-immunoelectrophroesis can be corroborated. We also intend to investigate avenues into analysing the tanning products used in the production to reach a more comprehensive view of the manufacturing process used for the leather.

Acknowledgements

We would like to thank the following funding bodies for supporting our research: European Research Council under the European Union's Seventh Framework Programme (Gleba), Alexander von Humboldt Stiftung and Gerda Henkel Stiftung (Daragan). Initial counter-immunoelectrophoresis analysis of four samples was carried out by I.V. Kholodilova (Kiev City Bureau of Forensic Expertise). Access to the material and help were generously provided by Alla Pleshivenko (Zaporizhia Regional Inspectorate for the Preservation of Historical and Cultural Monuments), Zoya Popandopulo and Andrei Antonov (Zaporizhia Regional Museum), Andrei Lopushinskij (Kherson Regional Museum), Artem Ivantsev and Irina Koval'ova (Oles Honchar Dnipro National University), Olga Buravchuk and Sergei Polin (Institute of Archaeology of the National Academy of Sciences of Ukraine). Image of the helmet from Peredrijeva Mogila and permission to reproduce kindly provided by Yuri Bilan (National Museum of the History of Ukraine).

[35] Fedorov and Gorshkova 2001.

Saddles of the Hun-Sarmatian period

Elena V. Stepanova[1]

Abstract

Equestrian equipment during the Hun-Sarmatian period was extremely diverse. Scythian-type pad saddles maintained their popularity until the 2nd century but new types of soft saddles also appeared, both Parthian and Roman. Wooden saddlebows were invented at the end of the 1st century BC or beginning of the 1st century AD. The seats were furnished with the panels of Scythian-type pad-saddles and the bows were attached to the tops of semi-circular supports. These saddles can be called 'semi-rigid', unlike rigid saddles which had a proper saddletree. The earliest saddlebows have been found in tombs of the Xiongnu of the 1st century BC (Tsaram, Noin-Ula), but semi-rigid saddles became the predominant type from the 3rd century onwards. The most widespread were saddles with semi-circular bows. Wooden bows and models of such saddles, as well as depictions of them, are known from China, Kyrgyzstan, Kazakhstan, Europe and North Africa. From the 4th to 6th centuries saddles with tall П-shaped bows and stirrups became popular in China, Korea and Japan. Their invention is attributed to the Xianbei kingdom. These saddles usually had metal overlays on the bows and supports, and were used primarily in battle. It was difficult to mount with this type of saddle, so special mounting loops were invented and swiftly became used as stirrups. At the same time, civilians continued to use saddles with semi-circular bows without protective overlays or stirrups. European saddles of the early 5th to early 6th centuries had sets of overlays similar to Asian saddles with П-shaped bows. The first saddles with saddletrees, invented no earlier than the first half of the 6th century, were Turkic. They completely reproduced in wood the semi-rigid saddles of the preceding period. Thereafter, improved metal stirrups became an integral part of the saddle.

Keywords: Saddles; Scythians; Xiongnu; Sarmatians; Romans; Parthians; Sasanians; European Huns; Han; Xianbei; ancient Korea; saddlebow; saddletree; supports

Introduction

The Hun-Sarmatian epoch – a term still used for the periodisation of the nomadic cultures of the Eurasian steppe zone – covers the period from the post-Scythian (2nd–1st centuries BC) to the ancient Turkic time (6th century). Equestrian equipment of this period was extremely diverse in comparison with that of the previous Scythian period. New constructions and decorative elements were introduced and were used alongside old designs. This especially applied to saddles. In these turbulent times, the saddles were more advanced than the previous soft Scythian type and they became transitional links to the later saddles with a rigid frame.

A few words should be added here concerning the terms used in this paper and the purpose of the individual elements of saddles. Most saddles today are what are called rigid saddles, and their construction is based on a rigid frame, i.e. a saddletree. A saddletree consists of two panels called bars and two curved elements – the pommel and cantle – which join the bars together. Traditionally all elements of the saddletree, from the earliest rigid saddles, were made of wood, as the name implies (in Russia, for instance, until at least the 18th centuries the saddletree was also called a 'derevyaga', from 'derevo', the Russian word for tree). Later on, in about the 16th century, metal (iron) saddlebows also begin to be used. What is the purpose of the saddletree? Most importantly, its construction elevates the rider above the horse's backbone, which used to be injured by intensive riding before the invention of rigid saddles.[2] The space between the bars of the saddletree and underside of the bow is called the gullet. This is a very important element of a saddle: in a correctly chosen saddle there is a space between the horse's backbone and the frame of the saddle, and this is clearly visible from behind.

Another very important function of the saddletree is to ensure full use of the stirrups, which are not only the means of mounting the horse but also make it easier for the rider to rise or stand in the saddle when in motion. The stirrups are attached to the saddletree by stirrup leathers. In this way the saddletree distributes the rider's weight evenly over the bars, i.e. in the area where the saddle comes into contact with the horse's back. The use of stirrups enabled cavalrymen firstly to increase the effectiveness of a hacking blow, and secondly to make wide use of the trot – the most economical gait for the horse but jolting and uncomfortable for the rider. The trot, the cavalry's main operational gait,

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[2] Levine 2000: 245–47; Benecke, Pruvost and Weber 2010: 252.

only became possible with the use of rigid saddles with stirrups.

Moreover, the saddlebows play an important part in keeping the rider firmly within the saddle. The higher and more vertically they are placed, the more solidly the rider is pressed into the saddle. It is true that this causes certain problems when mounting and dismounting, especially in full armour, but these are partly compensated for by the stirrups.

Rigid saddles may have external or concealed frames. In the latter case the saddletree is hidden within the thickness of the saddle cushions and the soft filling of the bows. Examples of saddles with external frames are those of the Eurasian nomads, from the medieval period up to the present day (Turkic, Mongolian, etc.), Cossack saddles, the military saddles of 19th and 20th century cavalry, cowboy saddles, and so on. Examples of saddles with concealed frames are European saddles of the 16th to 18th centuries and the flat English, Australian and other saddles which originated from them.

In order to increase the firmness of the rider's posture without reducing his mobility, saddles with concealed frames and short bows have additional elements as supports for the rider's thighs: knee rolls, thigh cushions (bolsters) and *battes* (fr.) – flat wooden plates attached to the pommel and the cantle on Western European saddles of the 16th to 18th centuries. *Battes* and saddletrees were upholstered in soft materials to form the specific shape of the baroque saddle.

Front *battes* were also retained on so-called flat saddles. With the invention of the English saddle, *battes* were dispensed with and their role replaced by the thicker parts of the saddle cushions and the flaps of the saddle. These bulges, called knee rolls and thigh cushions or bolsters (in everyday usage they are simply called supports), are not connected to the saddletree and are made by means of the cut and stuffing of the saddle cushions and by corresponding extra rolls on the flaps of the saddle. Australian saddles are an original variation on the English version: they have flat leather elements which protrude over the front edge of the saddle cushion and perform a similar function to pads.

Other integral parts of saddles are saddle blankets (sweat-cloths) and fastening straps in the form of girths, girth straps, breast bands and cruppers. Saddle blankets are placed beneath the saddle to absorb the horse's sweat and reduce the pressure on its back. Saddle blankets were made of felt in Scythian times. Girths are broad firm straps of leather or other material, which pass under the horse's body and around the sides and hold the saddle in place. Girth straps are short straps attached to the saddle for fastening the girth. Breast bands (known as breastplates on a modern saddle) and cruppers are additional fixing devices, which prevent the saddle from moving forwards or backwards, especially when jumping or riding over broken terrain.

Flaps or similar elements are also important parts of saddles. Flaps can either be single or double (on saddles with stirrups). Their purpose is to protect the sides of the horse and the rider's legs from rubbing against each other and against the girth and stirrup straps and their buckles. In Asian saddles with an external frame the function of the lower flap can be fulfilled by leather shabracks.[3]

Rigid saddles evolved from the pad-saddles invented by the Eurasian nomads no later than the 7th century BC. No reliable evidence for the use of saddles in the pre-Scythian period has yet been found. Pad-saddles did not have hard frames (saddletrees) or, consequently, saddlebows. However, functional elements such as saddle cushions with channels between them, saddle blanket (sweat-cloths), girth straps, girths, girth buckles, breast bands and cruppers already existed. Pad-saddles were largely similar to saddles with concealed frames, including in their outward appearance. Leather saddle cushions filled with wool, deer hair or dry grass had wing-like projections on the front edge (single flaps) and supporting elements, two at the front and two at the back corresponding in function and location with the knee roll, thigh cushions (bolsters) and *battes*. From now on, for the sake of brevity, we will call the wing-like projections as flaps, and the supporting elements we will term supports.[4] The supports of pad-saddles were formed by the cutting and stuffing of the saddle cushions and were of varying shapes: semi-circular, conical, elongated.

[3] The term *shabrack* comes from Turkic word *çaprak*. Shabracks are important details of hard Turkic and Mongolian saddles from the Middle Ages to the present day. Initially they were a large rectangular leather blanket placed over the sweat cloth. It had three functions: protection of the rectangular sweat clothes on nomads' saddles during rough weather, hence they were sometimes described as 'a roof for a sweat cloth'; protection of the horse's sides from chafing by stirrup leathers or the rider's legs; and as decoration. In Russian, traditionally 'shabracks' refer to any large decorative, especially rectangular, blanket of fabric or leather which was placed over the sweat cloth and beneath the saddle. In that sense this term will be used in this paper. For decorative covers placed over the saddle these can be of different form: the terms *waltrapp* and *saddlecloth* are instead used for these in order to avoid confusion although in modern Europe in everyday practice these terms are usually used as synonyms for a *shabrack*.

[4] Both hippological and functional or descriptive terms are used to characterise these elements in archaeological literature. For example, Hubertus von Gall uses the term *bauschen* (German for *knee roll*) when describing a saddle on a vessel from Kosika (von Gall 2002: 407), while Georgina Herrmann uses the analogous English term roll when describing Scythian and certain Parthian saddles (Herrmann 1989: 764–65, 767). More frequently, general terms linked to the function of the restriction, protection or support, e.g. guard, support, restraint, or to the external appearance of protuberances, e.g. horns (for Roman saddles) and arches (for Scythian and other similar saddles) are used.

The typology of pad-saddles may be based on the shape of the supporting elements and the cushions themselves, determined by their construction. It can be recognised easily in depictions. Since the cushions have very rarely survived, unsurprisingly given their construction materials, important information is provided by various overlays of hard materials which make it possible to reconstruct the shape of the supports. Additional indications can be the specific characteristics of the straps, accessories and decoration of pad-saddles, which allow the identification of different types.

Saddles of the Scythian type

Pad-saddles of the Scythian type, which originated among the nomads of the Scythian group, were the earliest and most widely used. They can be reliably reconstructed based on the complete examples and numerous fragments preserved in the frozen barrows of the Pazyryk culture of the Altai mountain region and eastern Kazakhstan, and also found in burials in Xinjiang (China) (Figure 1). Accessories and decorative elements, as well as depictions, are known from other regions and these are instructive in charting the spread of this type of saddle from the 5th to 3rd centuries BC over the entire Eurasian steppe and neighbouring territories from Greece to China. Leather saddle cushions of the Scythian type were slightly or substantially wider at the front and these wing-like protrusions could be of circular or triangular shape. In order to prevent the stuffing from moving, the cushions were quilted with leather thongs and cords of wool or horse hair. The semi-circular shape of the supports was formed by four lens-shaped inserts between the principal upper and lower surfaces of the cushions (Figures 2.2, 3.3). The height of the supports was determined by the transverse dimensions of these insets and could be as much as 21 cm, although more frequently the height of the front supports varied between 10 and 15 cm, while the back ones were 2–3 cm lower. The width of the supports matched the width of the saddle cushions (minus the gullet). The characteristic appearance of the supports from the side was caused by the through stitching of the rounded ends of the outer cloths of the saddle cushions, the upper parts of the lens-shaped insets (up to half their height) and the stuffing between. The saddle arches made of wood or bone (four

Figure 1. Scythian saddles of the 3rd century BC and modern reconstruction: 1, the saddle from Pazyryk kurgan 5, Altai (State Hermitage Museum, inv. nr. 1687/107); 2, the saddle from Pazyryk kurgan 3, Altay (State Hermitage Museum, inv. nr. 1685/358); 3, the saddle from Subashi-1, burial M10, Xinjiang (Qi and Wang eds 2008: 106); 4, author's reconstruction of the saddle from Pazyryk kurgan 3

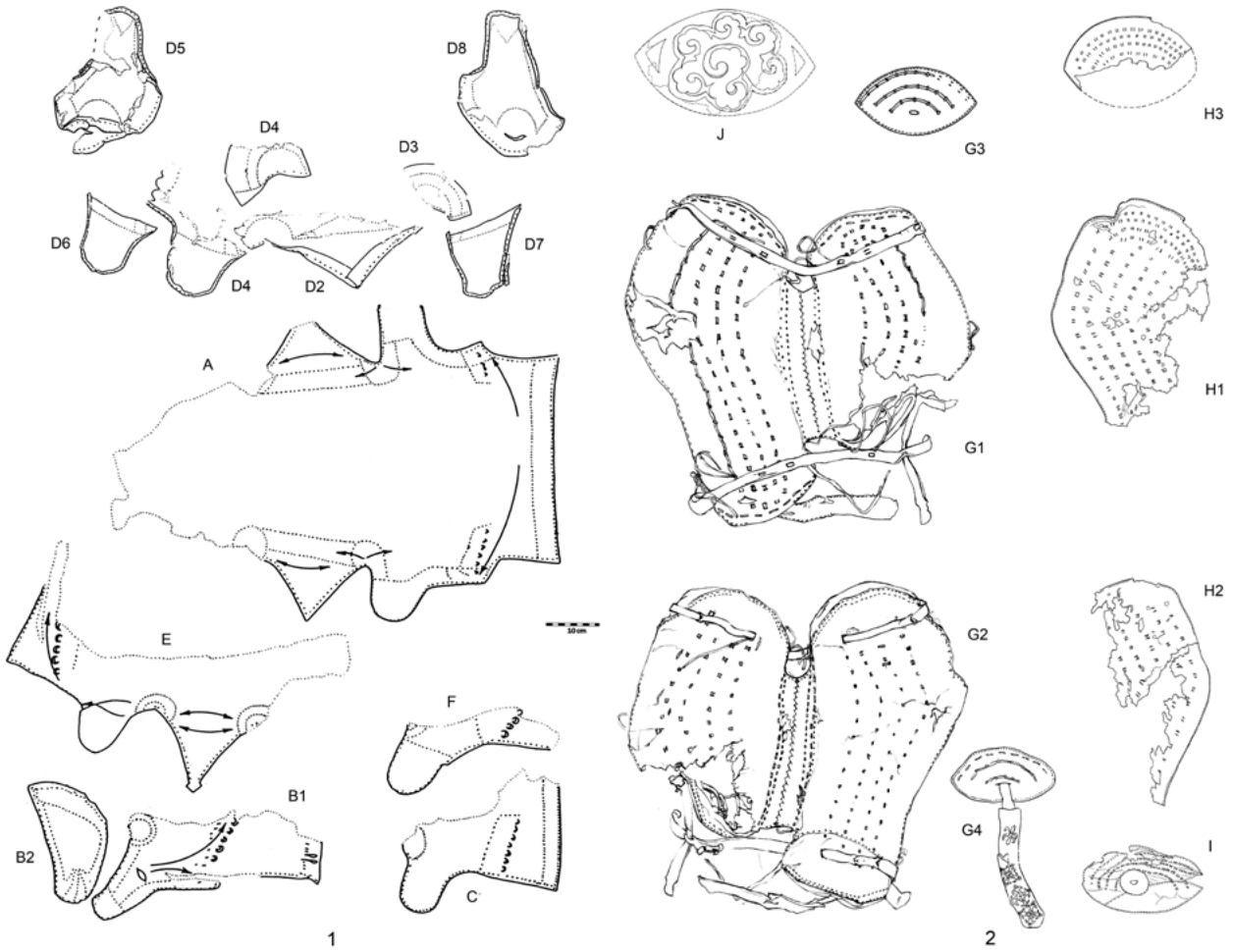

Figure 2. The essential elements of the construction of saddle cushions on Roman (1) and Scythian (2) saddles: 1, leather covers of the saddle cushions of the Roman: A: Valkenburg, Netherlands, B: Castleford, England, C: Vechten, Netherlands, D: Carlisle, England, E: Vindolanda, England, F: Newstead, Scotland (after van Driel-Murray, Connolly and Duckham 2004: fig. 4); 2, leather covers of the saddle cushions of the Scythian saddles, Altai mountains: G–I: Tuekta kurgan 1 and a felt decorative plate on a lens-shaped detail (front support): J: Bashadar kurgan 2 (G1–G 3, H–J: author's drawings, G4: Rudenko 1960: fig. 78)

for a saddle) or decorative strips of leather or felt were attached along the upper rim of the supports. The girth straps on Scythian saddles were attached above the saddle cushions, two more cross straps were arranged on the inside of the supports, the breast bands had withers straps and were fastened or tied to the girth straps. Saddle blankets (sweat cloths) were stitched to the saddles, so shabracks were not normally used.[5] Additionally, they used decorative coverings, which matched the shape of the saddle cushions and were fastened on top of them. We can observe these details on many depictions, for example, on wooden 'horses' from Katanda kurgan, the silver amphora from the Chertomlyk kurgan, a comb from Kul-Oba, and belt plaques with 'the resting under a tree and 'boar hunting' scenes from the Siberian Collection of Peter the Great.[6]

The pad-saddles with semi-circular supports were used throughout the Scythian period and beyond: they remained popular until at least the 2nd century and played an important role in the further evolution of saddles. It is this type of saddle which is depicted on a sculpture of a saddled horse with a fallen rider dating from about 200 BC which is in the Metropolitan Museum, New York, on a silver vessel from Kosika, Bosporan funerary stelae and paintings in burial-vaults from the 1st and 2nd centuries, statuettes of the 'Bosporus horseman', Bactrian embroidery from

[5] The dress shabracks from Barrow 5 of the Pazyryk burial-mound are, in a sense, decorative sweat cloths. They have felt bases with felt appliqué or imported fabrics stitched onto them and the saddle area is free of decoration. All the saddles from this barrow have their own attached sweat cloths. For saddles from the other Pazyryk culture barrows and for the Scythian type saddles in general, this combination is uncharacteristic. It may be that similar 'shabracks' seen in some depictions were also used by the Thracians. The Western Asiatic Achaemenid influence (eye-catching horsecloths for riding) in both cases is not in doubt.

[6] Kiselev 1951: table XXXI; Alekseev, Murzin and Rolle 1991: cat. 91, det. 7; Piotrovsky, Galanina and Grach 1986: fig. 215; Simpson and Pankova eds 2017: 57, 64, cats 15, 22.

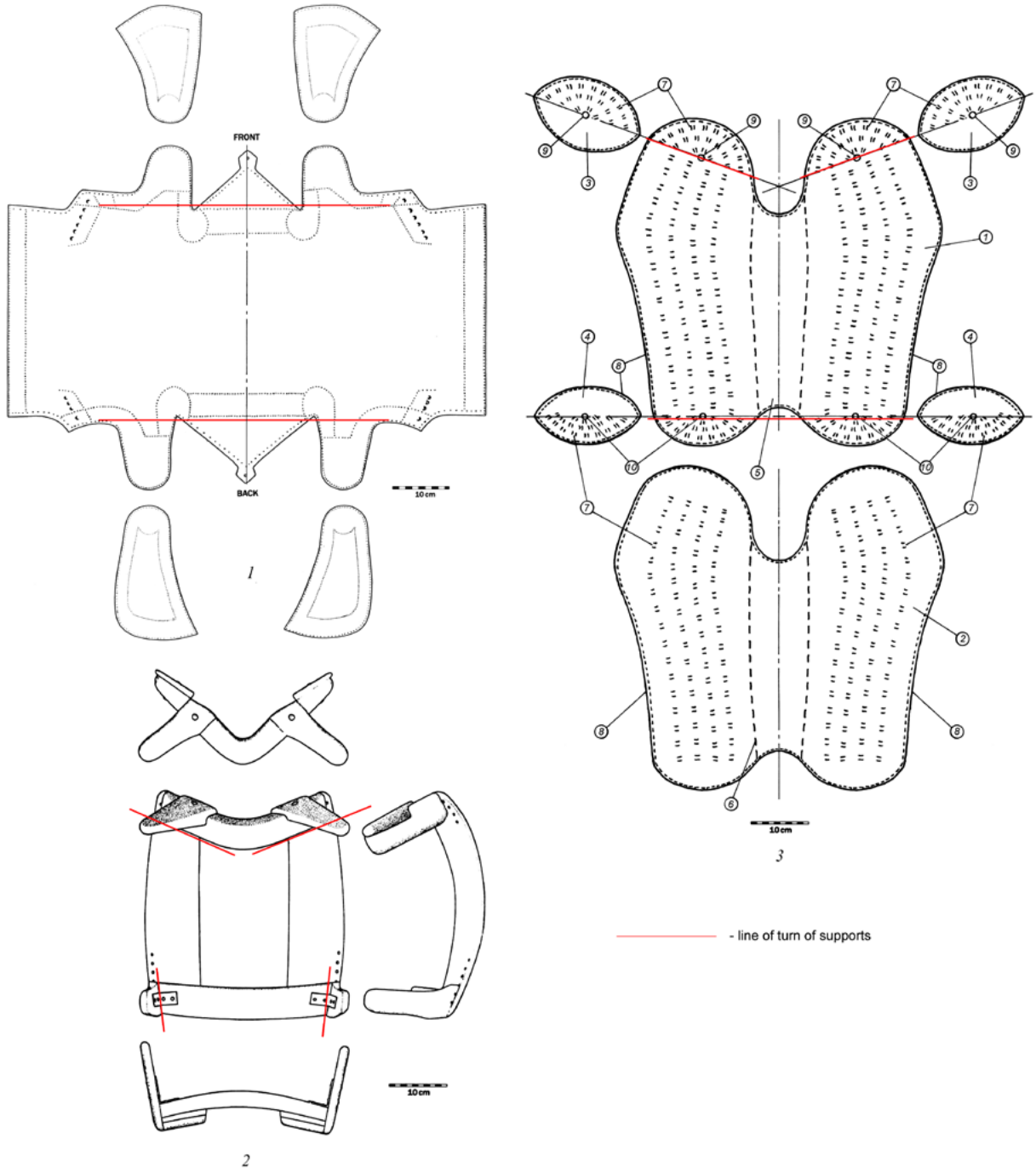

Figure 3. The construction of Roman and Scythian saddles: 1, the reconstruction of the pattern of the Roman saddle; 2, reconstruction of the saddletree of the Roman saddle (*1,2* – van Driel-Murray, Connolly and Duckham 2004: figs 3–4); 3, author's reconstruction of the pattern of the Scythian saddle: 1) upper integument of the panel; 2) lower integument of the panel; 3) front lens-shaped inset; 4) rear lens-shaped inset; 5) saddle chute; 6) seam enclosing the saddle chute; 7) slits for the quilting; 8) seams connecting pieces of the panel sheath; 9) opening for thong with pendant attached to the support; 10) opening for the crupper-strap

kurgans 6 and 31 at Noin-Ula,[7] Orlat and Ordos belt

[7] It is impossible to agree with the interpretation of the saddle on an embroidery from kurgan 31 at Noin-Ula which was proposed by Natalia Polosmak (2009: 52) to be a Roman-type 'horn' saddle. It is sufficient to compare it with the covers of saddle cushions from Roman saddles and depictions of them and the cushions of Scythian saddles and their depictions, for example on the wooden horses from the Katanda kurgan (Kiselev 1951: pl. XXXI). If you look at the Scythian saddle in ¾ view the semi-circular supports look like rounded protuberances meeting at the same point. Roman saddles were never depicted in this way, because their 'horns' were nearer the edges of the cushions. The absence of the rectangular saddlecloth typical of Roman saddles and the presence of a breast band with withers straps decorated with plaques and attached to the girth straps also unequivocally argues in favour of this being a depiction of a Scythian-type saddle. The tracing of the embroidery on page 53 is unsuccessful. The saddle pendants and the crupper overlay are shown as animals' paws, whereas on photographs they resemble pointed ovals.

Figure 4. The depictions of Sarmatian and Parthian saddles of the Scythian type of the 2nd century BC–2nd century AD: 1–2, reliefs from Palmyra, Syria (author's photograph); 3, terracotta 1st– 3rd century from Syria or Iraq, The British Museum, BM 135684; 4, stela from Anapa (Gavrilov ed. 2004: KBN 1197); 5, depiction on the vessel from Kosika (Treister 1994: fig. 7)

plaques, Gandharan reliefs and funerary statuettes of the Chinese Qin and Western Han dynasties (Figures 4.4–5, 5.1–6, 8–14, 9.1–3).[8]

[8] Connolly 2001: fig. 23; Treister 1994: fig. 7; Davydova 1990: cats 44–50, 52–54; Goroncharovsky 2003: figs 9, 12; Stepanova 2004: 239–45, fig. 1; Rostovtseff 1913/14: tables LXXIX, LI.6; Diatroptov 2001: fig. 6; Astasheva and Murasheva 2003: cat. 19; Rudenko 1962*a*: table LXIII; Polosmak 2009: 52; Pugachenkova 1989: figs 71–72; Bunker *et al.* 1997: 85, fig. A131, f.31; Tissot 1985: figs 285, 287; Cooke ed. 2000: cats 102, 121.

Figure 5. Depictions of saddles of Scythian type, 3rd century BC–2nd century AD: 1, gold belt plaque, Siberian Collection of Peter the Great, late 3rd–2nd century BC (Simpson and Pankova eds 2017: cat. 22); 2, bronze belt plaques, 2nd century BC (Bunker *et al.* 1997: fig. A131); 3, bronze belt plaques, Murun soum, Khentii province, Mongolia, 3rd century BC–1st century AD (Erdenechuluun and Erdenebaatar 2011: fig. 382b); 4, detail of the depiction on ivory plate, 'Temple of Oxus', Takht-i Sangin (Litvinsky 2001: fig. 6); 5, bone belt plaque, Orlat burial-mound 2, Uzbekistan, 2nd–1st century BC (Pugachenkova 1989: fig. 72); 6, relief, Khalchayan (Pugachenkova 1971: fig. 6.2); 7, cameo depicting Alexander the Great (?) on a boar hunt (Rome, late 1st century AD), The State Hermitage Museum, inv. nr. ГР-12407 (Charles-Gaffiot and Lavagne eds 1999: no. 214); 8, depiction of c. 200 BC in the Metropolitan Museum (Connolly 2001: fig. 23); 9, saddle on the horse of the terracotta army from the burial of the emperor Qin Shi Huangdi (author's drawing); 10, clay figurine, Western Han (Vainshtein 1991: fig. 96.2); 11, saddle on a bronze horse, Eastern Han, Rietberg Museum (author's drawing); 12, fired clay figurine of horse, 1st century BC–1st century AD, Bahrain (author's drawing based on Lombard and Basmati-Fatah 2012: 8); 13, relief with scene of worship of Buddha, Gandhara, Calcutta Museum (Tissot 1985: fig. 285); 14, relief with a combat scene, Nahardzhunakonda, 2nd century (Tyulyaev 1988: fig. 206)

On these depictions, most differences can be observed in the interpretation of the front supports, shown from the side. For example, on the reliefs and graphic depictions, depending on the skill of the artist, the supports can resemble semi-circular elements either bent inward or outward (the latter are resting on the horse's shoulders); in the form of the flattened petals, bent inward; or in the form of a triangle (on a riderless horse). On the profile depictions the saddles can be shown in ¾ view to make all four supports with distinguished decorative pipings or arches clearly visible.

Parthian saddles were apparently also of the Scythian type judging by depictions of a mounted hunter on a fresco from Dura (Europos), mounted archers on terracotta plaques, horses and riders on Palmyrene reliefs,[9] coins of Quintus Labienus dating from 40–39 BC, graffiti from Old Nisa dating from the 1st century BC and a relief from Tang-e Sarvak in southwest Iran.[10] They are easily recognised by their lack of saddle-cloths, the characteristic shape of the cushions with four semi-circular support elements and the withers straps on the breast bands (Figure 4.1–3). A rare depiction of a saddle with a large rectangular shabrack on the fragment of a statue from Palmyra with a riderless horse[11] is identical to the earlier saddle sets found at kurgan 5 at Pazyryk. The saddle has short semi-circular supports, is placed on top of the shabrack and has a cross strap whose ends form the girth straps. The ends of this strap are threaded through slits in the saddlecloth a little lower than the edge of the saddle cushion. A piping can be discerned near the rear supports, while the front supports, which have been partly broken off, were taller and bent inwards. However, the girth is moved forward as on Black Sea region depictions of the Scythian and Sarmatian period, such as a silver amphora from Chertomlyk, a comb from Kul-Oba, a silver vessel from Kosika and Bosporan funerary reliefs.

The saddles on 1st and 2nd century terracottas and reliefs featuring Parthian and Bosporan horsemen are virtually identical, with semi-circular flattened supports bending inwards in the shape of a petal and with neither shabracks no saddlecloths but with phalerae on the breast bands and cruppers. On some Parthian reliefs the saddle cushions are visibly wider at the front, but this characteristic is substantially less pronounced than on Bosporus stelae where it is emphasised, even somewhat exaggerated. This may be linked with the cut of the Parthians' very wide and voluminous trousers which covered the flap of the saddle and the lower part of the front support (Figure 4).

Although the main construction features of Scythian saddles remained unchanged, saddle accessories were constantly improved and the decoration evolved. Early Scythian decoration (7th–6th centuries BC), which had been relatively homogeneous across the entire Eurasian steppe, eventually evolved into numerous local styles during the Classical period (5th–3rd centuries BC) but certain residual Scythian traditions survived in the accessories and decoration of the post-Scythian period. The characteristics of saddles during the latter period were girth buckles with movable tongues which were virtually the same as their modern equivalents, and we can see them on the horses of the Qin cavalry. However, in Xiongnu burials of the 2nd and 1st centuries BC we see bone buckles without tongues but with a ledge within the frame which were typical of late Scythian saddles, for example the buckles from the Ivolginsk settlement.[12] They are not recorded on belts in Xiongnu burials, but in size and shape they fully correspond to girth buckles from the 4th to 3rd century BC kurgans of the Pazyryk culture.[13] Similar buckles dating from the 4th to 2nd centuries BC found in large numbers in burials of the Sargat culture of the forest steppes of western Siberia continued to be used, according to Vladislav Mogilnikov, as late as the 2nd century and may have been used as girth buckles.[14]

The nomads' breast bands, as in the Scythian period, were usually attached to the girth straps and the crupper straps were attached to the rear supports. From the 3rd century BC the places where the withers straps joined the main strap of the breast band were often decorated with phalerae. However, in the western Han version of late Scythian saddles the breast bands, which did not have withers straps, were attached directly to the front supports (Figure 5.10) and this continued in all the subsequent modifications of saddles in the Far East (China, Korea, Japan) up to the appearance of rigid saddle in the Ancient Turkish time. Phalerae were consequently not used.

From the late 3rd to 2nd centuries BC the bunches of straps with pendants at the rear of saddles which were typical of the Scythian period were replaced by large tassel-pompons. They can be seen on a pair of plaques depicting a boar hunt in the Siberian collection of Peter the Great, on Ordos bronzes, bone plaques with hunting scenes from the Orlat burial-ground and Takht-i Sangin,

[9] The sculptures and reliefs from Palmyra are undoubtedly the best and most representative depictions of Parthian saddles. Georgina Herrmann, who scrupulously describes the depictions of saddles with four projections, uses the term 'roll' when describing the saddles from Palmyra (Herrmann 1989: 767).

[10] Herrmann 1989: pls V, XI–XIII; Grueber 1910: pl. CXIII.19–20; Pilipko 1996: fig. 45; von Gall 1990: pls 3–4.

[11] Herrmann 1989: pl. 10a.

[12] Davydova 1995: pl. 182.4, 5, 9.

[13] Stepanova 2006: 125, fig. 9.

[14] Mogilnikov 1992: 304, pl. 124.17, 59, 67.

and on later Sasanian and Gandharan sculptures[15] (Figure 5.1–6).

Features which proved surprisingly 'tenacious' were the decorative plaques of hard materials on the obverse side of the semi-circular supports[16] and the plaque-pendants in the shape of a shield or a drop on the front supports, the girth straps, the ends of the cross-straps and details of the adjustable cruppers. These details have been recorded by archaeologists in the later kurgans of the Pazyryk culture (3rd century BC) and also in Xinjiang, for example, in the late Scythian burials at Subashi and Jiahoe Goubei.[17] They continued to exist in central Asia until the end of the 1st century BC (Figures 1.1–4; 5.1–2, 9–11).

Shield-shaped plaque-pendants are depicted on the horses of the terracotta army from the mausoleum of Qin Shi Huang, on numerous statuettes from western Han graves, gold plaques with boar hunting scenes from the Siberian Collection of Peter the Great (the dating proposed for them by Konstantin Rets to the late 3rd to 2nd century BC appears the most convincing), Ordos bronze plaques depicting a fight between dismounted horsemen, known in several versions and dated according to the contents of the burials to the 2nd and 1st centuries BC,[18] Orlat bone belt plaques[19] and on an embroidery from kurgan 31 at Noin-Ula.[20] Wooden shield-shaped pendants were recorded in kurgan 6 at Noin-Ula.[21] A saddle from Subashi (Figure 1.3) had, in addition to pendants for the front supports, two additional pendants for the rear supports,[22] and on Chinese depictions of the Qin and Han dynasties there is a further pendant between them (Figure 5.9–11).

Silver overlays on supports of an original lens-pear shape were found in exclusive Xiongnu burials dating from the late 1st century BC to the first half of the 1st century AD in the Gol-Mod burial-ground, in the Tsaram kurgan (Transbaikal), kurgans 6 and 20 at Noin-Ula (Mongolia) and Grave 219 at Seogam-ri, Pyongyang (North Korea) in the Lelang territory. In each case these pairs of plaques were part of sets of equestrian equipment used along with phalerae of similar design, and in the Tsaram kurgan they were recorded next to the saddle[23] (Figure 6.4–5).[24] In size and shape they closely resemble the lens-shaped plaques from barrows of the Pazyryk culture and partly resemble them in the subjects depicted (elks and horses at Pazyryk (Figure 6.1–3), a yak, a goat and unicorns (?) with the Xiongnu, dragons at Lelang). Similar plaques may have been more widely used, but if they were made of wood, as in the previous period, they may not have survived. Interestingly, in late burials of the Pazyryk culture large circular phalerae were also used to decorate the places where the withers and main straps of the breast bands joined, for example in Shibe and Pazyryk kurgans 4 and 5, and also depicted on a felt rug from Pazyryk kurgan 5.[25]

However, the progress of equestrian equipment did not come to a standstill. The increasingly wide use of heavy cavalry required more reliable saddles. Active research was carried out in this regard and in the post-Scythian period new types of pad-saddles appeared – Roman and Sasanian.

Roman saddles

The saddles used by the Roman cavalry from the 1st century BC had rectangular saddle cushions with rounded edges, without pronounced flaps and with the four conical supports ('horns') moved to their edges. The front supports were a little higher than the rear ones, as on Scythian saddles. The characteristic details of Roman saddles were rectangular saddlecloths (or waltraps) with a fringe which were placed on the seat between the supports. They dropped down significantly lower than the edge of the saddle cushions and partly performed the function of the missing flaps. The breast bands and crupper were attached directly to the saddles by two straps (?) and the joins covered by phalerae. The breast bands had no withers straps. Girth buckles with movable tongues were used, but how the girths were fixed is not entirely clear.

Saddle cushion covers (Figure 2.1) with remains of straw inside them and copper overlays on the 'horns' (Figure 8) have been found in the European forts of Valkenburg and Vechten (Netherlands), Castleford, Carlisle and Vindolanda (England) and Newstead (Scotland).[26] The construction of Roman saddle

[15] Rudenko 1962*b*: pl. IV.5; Rets 2004: 327, fig. 1.3; Bunker *et al*. 1997: 85, fig. A131, f.31; Pugachenkova 1989: figs 71–72; von Gall 1990.

[16] Lens-shaped wooden plaques are already encountered in the early phase of the Pazyryk culture: for example, one set (with a depiction of a fantastic eagle) comes from Barrow 2 at Bashadar, but they are typical of later burials (Stepanova 2006: pl. 7), where they vary in shape (lens-shaped, trapezoidal, bow-shaped) and material (wood, bone, thick leather), whereas wooden plaques were usually covered in gold or tin foil.

[17] Rudenko 1953: tables XLVII.6–9, XLVIII.1, L.1, LIII.1, LIV.1, 6–7, LVII–LIX, LXI.5, 7–11, LXXXI.3, 5, 8–9, 11 etc; Stepanova 2006: 132–35, table 7; Shulga 2011: fig. 5.

[18] Cooke ed. 2000: cats 102, 121; Rudenko 1962*b*: table IV.5; Rets 2004: 331; Bunker *et al*. 1997: 85, fig. A131, f.31 etc.

[19] Pugachenkova 1989: figs 71–72; Nikonorov and Khudyakov 1999.

[20] Polosmak 2009: 52.

[21] Rudenko 1962*a*: 81, fig. 27l.

[22] Liu Yonghua 2002: fig. 154.

[23] The saddle has silver plaques with depictions of ibexes, and a similar bronze one was apparently used as a frontlet. In the publication and, accordingly, in fig. 2: 4, the bronze plaque is cited as being better preserved.

[24] Rudenko 1962*a*: tables XXXVI.3, XXXVII.3; Polosmak 2009: 69, 73; Minyaev 2009: 57, figs 14–15.

[25] Barkova 1979: fig. 2.24; Rudenko 1953: tables LXIII.2–3, XCV.

[26] Connolly and Driel-Murray 1991: figs 4, 7, pl. VII; van Driel, Connolly and Duckham 2004: figs 4, 6.

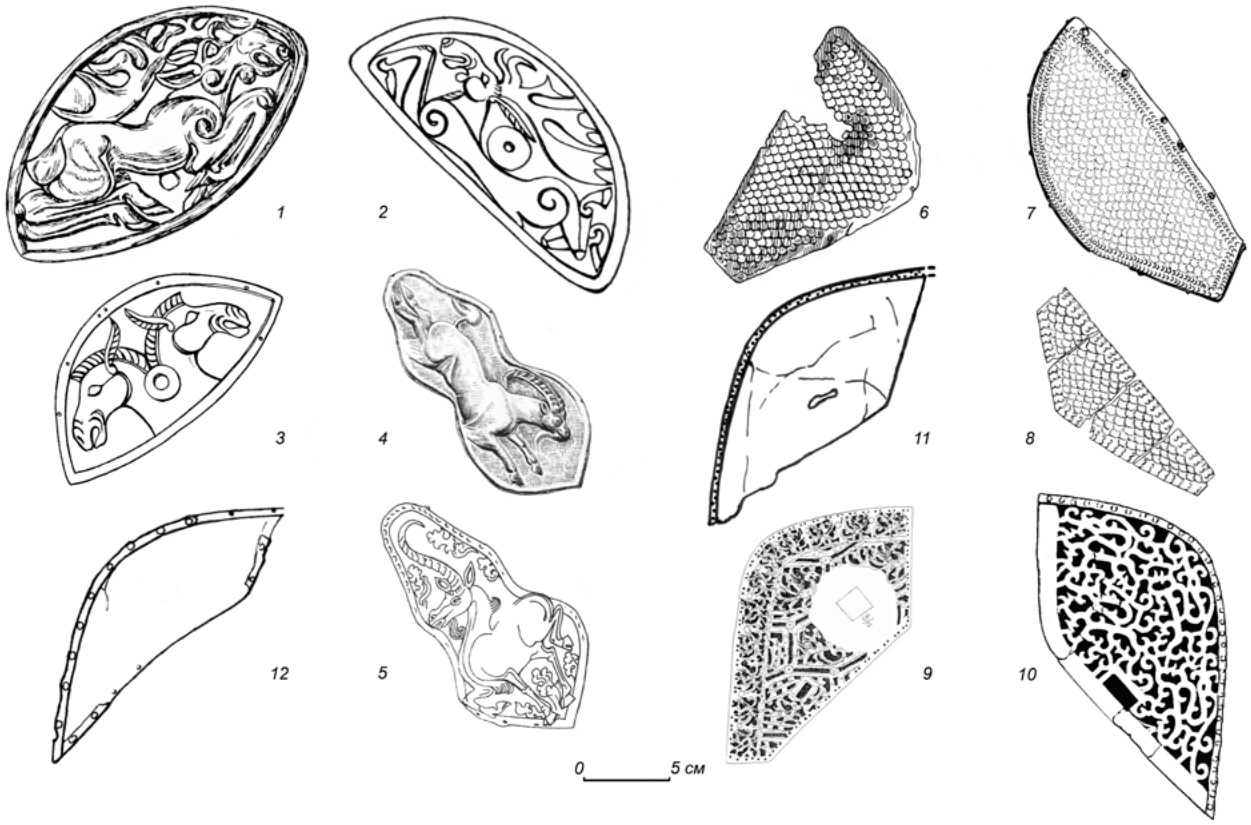

Figure 6. The overlays for the semi-circular supports of the late Scythian saddles (1–3) and saddles of the 1st–6th centuries (4–10): 1, wood, Altai, Frolov collection (Rudenko 1960: fig. 136, к); 2–3, thick leather, Pazyryk kurgan 5 (Rudenko 1953: tables CVI.1, CV.2, with clarified dimensions); 4, silver, Transbaikal, Tsaram (Minyaev 2009: 57, fig. 15); 5, silver, Mongolia, Gol-Mod (Polosmak 2009: 73); 6, gold, Novogrigorievka, burial 9 (Zasetskaya 1994: table 2.10); 7, gold, north Caucasus, Durso, horse burial 10 (Dmitriev 1979: fig. 4.4; 9); 8, gold, Vladimirskoe, burial 4 (Zasetskaya 1994: table 35.13); 9, gilded bronze, China, Chaoyang, burial 88 (Liaoning Sheng Wenwu Kaogu Yanjiusuo and Chaoyang Shi Bowuguan 1997: fig. 22); 10–12, gilded bronze and iron, Japan, prefecture Osaka, Maruyama kurgan, prefecture Shiga, Singaj, burial 1, prefecture Osaka, Nagamotiyama kurgan

cushions differed substantially from those on Scythian saddles (Figure 1.1), but the length of the seat and the maximum cross-width (in its finished form) was virtually the same. The sizes of the supports were also similar. The height of the insets (outer sheaths of the horns) varied between 15 and 18.8 cm and the 'functional' height (above the seat) – between 5.6 and 10.4 cm. The length of the horn-shaped projection on one of the fragments of the main part of a cushion from Carlisle was as much as 14 cm.[27] The maximum transverse dimensions of the lens-shaped insets recorded on Scythian saddles was 20 to 21 cm and the height above the seat about 13 cm (Figures 2.1, D 5, D 8; 2.2, J). However, as mentioned earlier, on most Scythian saddles these parameters varied between 10 and 15 cm, which took the height of the protrusion of the front supports over the seat to 5–8 cm. The rear supports were 2–3 cm lower. This was no coincidence: according to the evidence of François Robichon de La Guérinière the height of the bolsters of a military saddle in the early 18th century was about 10 cm, but saddles with bolsters of no more than 6 cm were considered most comfortable both in war and for field riding.[28]

Roman saddles, conveyed sufficiently realistically so that their 'identification' is not in doubt, appear on reliefs from the late 1st century BC and disappear in the late 2nd century AD (Figure 7).[29] Horns are already not shown so often in the second half of the 2nd century and the saddles are only vaguely outlined – the characteristic rectangular saddlecloth with a fringe, breast bands and cruppers with pendants.[30] During the 3rd and 4th centuries only such 'symbolic' depictions appear (this tradition is also continued in early Byzantine iconographic sources), or saddles are replaced entirely by horsecloths of animal skins (this motif is most frequently found on funerary

[27] Connolly and van Driel-Murray 1991: table 1.

[28] La Guérinière 2009: 92.

[29] Heintze, Kraus and Sichtermann 1967: figs 179b, 189; Andreae 1973: 421–24, 432; Charles-Gaffiot and Lavagne eds 1999: 86–87; Bishop 1988.

[30] Heintze, Kraus and Sichtermann 1967: fig. 217; Andreae 1973: figs 502, 531.

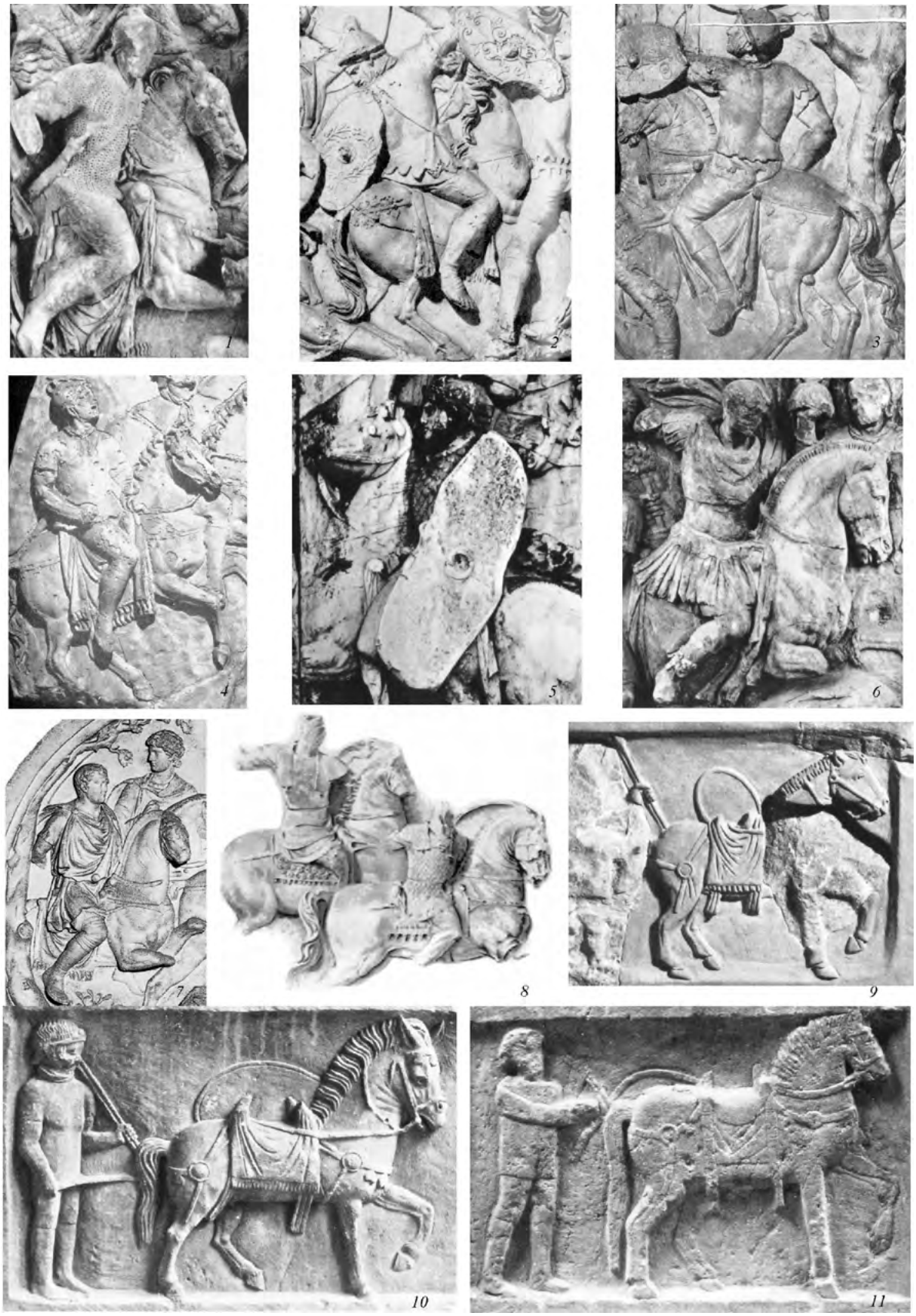

Figure 7. Depictions of the Roman saddles of the 1st–2nd centuries: 1, Trajan's Column, AD 107–117, Rome (Andreae 1973: 432); 2–4, Trajan's Column; 5–6, reliefs of Trajan, Constantine's Arch, Rome (Andreae 1973: 421–22); 7, medallion with scene of a boar hunt, made in the time of Hadrian (AD 117–138), Constantine's Arch, Rome (Hadrien 1999: 86); 8, relief from Mantua, early 1st century (Connolly 2001: fig. 1, 234); 9, stela from Neuenheim (Heidelberg) (Noelke 2006: fig. 52); 10, stela of Romanus, Cologne (Noelke 2006: fig. 33); 11, stele of Oluper, Cologne (Noelke 2006: fig. 36)

sarcophagi).[31] The latest example may be the depiction of a 'horned' saddle on a 4th–5th century silver Byzantine vase from a burial near the village of Kontseshty in Romania.[32]

Separate consideration must be given to the correlation between the saddles on official Roman monuments[33] and Germanic provincial stelae of the 1st and 2nd centuries, e.g. in Mainz, Cologne, Moers-Asberg (Krefeld) and Kalkara, Monterberg (Bonn), Heddernheim (Frankfurt) and Neuenheim (Heidelberg).[34] Whereas Roman saddles proper with their characteristic supports in the form of 'cones' in cross-section ('horns') are depicted in the mausoleum of the Julii in Saint-Rémy in Provence, on an arch in Orange, on a relief from Mantua, on the columns of Trajan and Marcus Aurelius and on reliefs featuring scenes of Trajan's war with the Dacians on the Constantine Arch in Rome, the depictions on the Rhine stelae are not so homogeneous.

The most widespread theme on these stelae is the so-called banquet in the afterlife. If a stela was dedicated to a cavalryman killed during a campaign, the lower register would depict his servant with a saddled and bridled horse. The saddles on these riderless horses are easy to make out. Most of them are undoubtedly of the Roman type. Regional variations can be seen in the long bunches of saddle-strings projecting from under the saddlecloth in the front and rear parts of the saddle (they do not appear in 'classical' depictions) and very tall horns that narrow noticeably towards the top (all four are usually shown) and have a pronounced incline inside the saddle. This tilting inwards of the tall support elements, the result of the sagging of the springy base of the saddle in the process of use, is very typical of pad-saddles (Figure 7.9–11).[35] Perhaps the closest saddle to the classical type is one that is realistically depicted on the Oluper stele from Cologne. It is shown above a saddlecloth, but that makes it possible to discern the shape of the saddle cushions and the way the saddle-strings were attached.[36] Oval shields are attached to all the aforementioned saddles on the left side (furthest from the viewer).

However, a number of stelae featuring a banquet and a saddled horse in the lower register show obvious traces of eastern influence, either Bosporan, Sarmatian or Parthian. A very interesting example is the saddle on a fragment of a relief from Heddernheim in Frankfurt Archaeological Museum. The saddlecloth has a fringe on the bottom edge, but is completely devoid of any signs of draping, though apparently shown above the saddle – the bottom edges of the cushions are not contoured. However, their upper parts are superbly modelled and all four supports in the form of short projections with oval bases are shown, gently and tidily bent inwards. A small drop is shown immediately behind the front supports. In the modelling of the saddle cushions and supports this saddle is similar to those from two Bosporan depictions: on the gravestone of Fallon, son of Pof, from Gorgippia and, in particular, on the stela of Julius Patius, son of Demetrius, from Kerch, though the first is shown as if from slightly above and the other two strictly in profile.[37]

The saddles on the stelae of Marcus Sacrius Primigenius from Cologne and Gaius Julius Primus from Kalkara differ even more from classical Roman depictions.[38] The saddlecloths are extremely long, reaching as far as the middle of the horse's metacarpus,[39] and the saddle-strings even longer. On the relief from Cologne the saddlecloth is fringed but ornamented, perhaps in imitation of a rug, and there is no draping, while on the relief from Kalkara there is no fringe and the draping is conveyed only vaguely. The bunches of saddle-strings in the upper part are held in decorative rectangular clips. The saddles are placed on top of saddlecloths (judging by the saddle-strings) which can be considered as shabracks, but their lower parts are shown indistinctly and the saddle from Cologne appears to have a flap.[40] The saddle from Kalkara has a Greek breast band in the shape of a narrow triangle. The supports on both stelae are shown in profile (with the edge towards the viewer), are flattened, and both the front and rear supports are greatly bent back. This interpretation of supports is very rarely encountered and takes us far to the east with Indian depictions from the Kushan period in the 1st and 2nd centuries, Indo-Scythian coins of Azes II from the second half of the 1st century BC, a holder depicting horsemen returning from a campaign in the Siberian collection of Peter the Great, paintings in the burial-vault of Anfesterius and a statuette of a cataphract from Kerch (?) dating from the second half of the 1st–2nd century BC.[41] The horses themselves also differ somewhat from depictions on other reliefs.[42] A

[31] Heintze, Kraus and Sichtermann 1967: figs 234, 244; Andreae 1973: figs 155, 586, 591–92, 594.
[32] Effenberger *et al.* 1978: cat. 5, pl. 4; Furasiev and Shablavina 2019: 26–30, figs 13–15, 1.
[33] Heintze, Kraus and Sichtermann 1967: figs 179b, 189; Andreae 1973: figs 432, 421–24.
[34] Heintze, Kraus and Sichtermann 1967: fig. 192a; *Roman Art* 1984: figs 35.3–4, 37; Noelke 2006: figs 32–36, 46–47, 50–52.
[35] Noelke 2006: figs 32–33, 52; Bishop 1988: figs 5–6, 8, 10–11, 13.
[36] Noelke 2006: fig. 36; Bishop 1988: fig. 11.
[37] Noelke 2006: fig. 50; Vainshtein 1991: fig. 96.4; Goroncharovsky 2003: fig. 12; Desyatchikov 1972: fig. 4.
[38] Noelke 2006: figs 35, 47; Bishop 1988: fig. 8.
[39] There were shabracks of this length in Pazyryk kurgan 5. These dimensions are appropriate only for dress equipment. Saddlecloths of this length were never shown on official Roman reliefs, even scenes of parades and triumphs.
[40] But see Bishop 1988: fig. 8.
[41] Stepanova 2004: 244; Tissot 1985: fig. 287; Tyulyaev 1988: fig. 206; anon. 2001: cat. 59; Rudenko 1962*b*: fig. 29, table XXII: 18; Astasheva and Murasheva 2003: cat. 19.
[42] On both stelae the horses have luxuriant manes conveyed in the form of individual twisted strands and the forelocks are collected in

particular feature is the wavy tails intertwined in the upper part, as, for example, on a Parthian relief in the Cleveland Museum of Art.[43] The rich bridle literally covered with convex patterned plaques on the stele from Cologne is reminiscent of the bridles on Sasanian graffiti from Persepolis and a relief at Naqsh-i Rustam which depicts the investiture of Ardashir I.[44]

A special group is formed by stelae depicting a racing rider with a spear in his right hand and an oval shield in his left. It is thought that earlier examples were limited to the figure of an attacking horseman and that on later versions a servant and a defeated barbarian were added. These stelae were particularly widespread in the forts on the Rhenish border between Worms and Bonn. Saddles on two such stelae from Cologne – of Titus Flavius Bassus and an unnamed stela (the inscription has been broken off), on the stela of Gaius Romanus Capito from Mainz and on a fragment of a group sculpture with Jupiter and a giant[45] are very similar to one another. All the saddles are placed on shabracks, which is not typical of Roman saddles. The shabracks have no draping or fringes, with the exception of the stela from Mainz, where they are barely outlined. In the depiction of the breast bands there may have been an attempt to combine 'Scythian' (Sarmatian (Bosporan), Parthian) and Roman traditions – the upper strap fixing the breast band goes above the support towards the withers, similar to the sloping withers straps on saddles from Palmyra. On the stela from Mainz another straight, wide breast band decorated with tassels (or a fringe) is shown directly below the saddle's breast band. Similar wide breast bands on shabracks (a felt base decorated with appliqué and pendants) have been recorded in Pazyryk kurgan 5 in addition to the saddles' own breast bands, made of narrow leather straps and decorated with plaques. The front supports on the stelae are conveyed as flat petals folding on to the rider's thigh. The rear supports are noticeably lower than the front ones. In three of the saddles they are almost vertical or slightly folded inwards, shown with their edges towards the viewer and tightly adjacent to the rider's buttocks, but on the earlier anonymous relief from Cologne they are quite low, in the shape of small rolls. In the latter depiction the shape of the saddle cushion with a prominent flap is easily visible. Its shape is similar to that on a stela with no inscription from the Nymphaeum necropolis depicting a racing horseman striking a fallen enemy with a spear.[46] On the stela from Mainz only the bunch of saddle-strings is visible: they do not emerge from behind the horse's body (as on Bosporan reliefs), but on the others they are not shown (the area is concealed by the horseman's sword). If one disregards the characteristic Roman phalerae with dangling vertical straps and the fork near the fastening of the crupper, these saddles are much more reminiscent of Bosporan examples, with short vertical rear supports with their edges towards the viewer and tall front supports in the shape of petals, and a saddle with a shabrack on the fragment of a sculpture of a horse without rider from Palmyra than Roman 'horned' saddles (Figure 9.4–6).[47]

Saddles on provincial reliefs therefore have both Roman and 'non-Roman' features but whether this represents different pictorial traditions, different saddles or whether these are hybrid examples is difficult to be certain.[48] I would suggest that the latter group of reliefs nevertheless depicts not Roman but Sarmatian saddles. All the provincial funerary stelae belong riders belonging to auxiliary cavalry which was mainly drawn from the barbarian population in these provinces.

Various types of saddles co-existed in the Roman empire. Horsemen of the auxiliary cavalry may have had more freedom of choice than those in the legions, to say nothing of the foederati. The Romans were undoubtedly familiar with Sarmatian (Bosporan) and Parthian saddles. They were also well-acquainted with another variety with semi-circular supports. Franco Cardini stresses the Roman familiarity with 'Greek' saddles, and Peter Connolly cites a saddle 'of a Greek type' on a depiction from *c.* 200 BC in the Metropolitan Museum, New York (Figure 5.8),[49] and in that instance it appears in a combat scene between a Celtic horseman and a Greek rider who has already fallen from his rearing horse. It is a Scythian-type saddle with cushions which are wider at the front, with short semi-circular supports and no saddlecloth. We know of other depictions of similar saddles with semi-circular supports from the Roman empire, for example, beneath an Amazon on a relief in the Julii mausoleum (Saint-Rémy, Provence, last quarter of the 1st century BC) and a cameo depicting Alexander the Great (?) on a boar hunt (Rome, late 1st century AD) (Figure 5.7).[50] On these depictions the

the shape of aigrettes. Although this interpretation is within the limits of the variability of these details on Roman reliefs, it apparently has Asian prototypes: for example, the manes and forelocks are conveyed in a similar way on the coins of Azes II, etc., while the gathering of forelocks into bunches is characteristic mainly of Asian regions, including Iran, India, central Asia and southern Siberia (cf. Bishop 1988: figs 1, 4, 11).

[43] Herrmann 1989: pls XII–XIII.

[44] Herrmann 1989: figs 1a, 3.

[45] Heintze, Kraus and Sichtermann 1967: fig. 192a; Noelke 2006: fig. 34.

[46] Davydova 1990: cat. 54.

[47] Davydova 1990: cats 46–47, 49, 52; Desyatchikov 1972: figs 1–3; Goroncharovsky 2003: fig. 12.

[48] Are there any examples of reverse influence? On the marble gravestone of Publius, son of Kos, from the 1st century (Archaeological Museum, Kerch), the rear support closest to the viewer is depicted in the shape of a rounded cone shifted to the edge of the saddle cushion, while the front support is shown in the traditional manner, in the shape of a petal. All the other elements of the saddle are typical of Bosporan reliefs.

[49] Cardini 1987: 54–55; Connolly 2001: 126, fig. 23.

[50] Heintze, Kraus and Sichtermann 1967: fig. 179a; Charles-Gaffiot and Lavagne eds 1999: cat. 214.

front semi-circular supports are shown reversed on the shoulder of the horse. However, in the late 1st century BC and 1st century AD such saddles, although they continued to be used, were probably considered by the Romans to be archaic and obsolete, which is why they are attributed to mythical or epic characters such as the Amazons and Alexander the Great. On a silver vase from Kontseshty dating from the turn of the 4th and 5th centuries Roman 'horned' saddles (with elegant curved 'polka dot' horns) are already depicted beneath Amazons fighting with Greeks.

With reference to both archaeological materials and iconographic sources, Peter Connolly made a reconstruction of a Roman saddle that won great renown and the approval of the academic community (Figure 3.1–2).[51] He posited that Roman saddles had an inner framework, although no substantial remains of saddletrees have yet been discovered and on representations they are shown flat and tightly pressed to the horse's body. Experimental versions of the construction have been made and tested during riding.[52] Modern saddles with an inner framework have been used as analogies for the construction of Roman saddles, but it must be noted this is a very late group of saddles in evolutionary terms, appearing only in the 16th century.

Connolly based his construction *a priori* on the absolute rigidity of the horns. In order to achieve this, he had to construct a fairly massive wooden framework with metal fasteners. However, practice has shown that the support elements may or may not have a hard base, which did not substantially affect the qualities of the saddles in use. As a result, the copper overlays on horns (Figure 8) found with sheaths of saddle cushions and intended to reinforce the supports of pad-saddles (like the corresponding overlays on Scythian-type saddles) turned out to be incompatible with a hard construction.[53] The excess hardness of the horns, together with their extreme height (on the reconstruction the rear supports were higher than the front ones, which is contradicted by depictions of Roman saddles: Figure 7) created problems in mounting the saddle which became apparent during the testing of experimental examples as the rider was injured during mounting, grazed his back while trotting and sometimes hung on the 'horns' as on a hanger, which was extremely dangerous in a number of cases.[54]

The researcher recreated the external appearance of a Roman saddle by close comparison with a group of Rhenish reliefs which have noticeable traces of Sarmatian influence.[55] His attempt to combine the outward appearance of one type of saddle with the pattern of another led to paradoxical results. The important difference between Roman saddles and those of the Scythian type, beyond the shape of the supports, lies in the angles of the line of the turn of the supports in relation to the longitudinal axis of the saddle. The angle of the line of the turn of the front supports on saddles of the Scythian type is around 55–60° (Figures 2.2, 3.3) (it is marked with crosswise straps), whereas on Roman saddles it is 90° (Figures 2.1, 3.1). Consequently, in order to achieve this angle as on the German reliefs depicting an attacking horseman, it was necessary for Connolly to stretch the cut of the cushion of a Roman saddle to the pommel, sloping inside the saddle at the same angle (Figure 3.2).[56] The line of the turn of the rear supports in both types of saddle is perpendicular to their axial line. However, in Connolly's reconstruction the wooden base of the rear supports was extended parallel to the axial line of the saddle and displaced towards the very edge, which is an obvious violation of the pattern (Figure 3.1–2). Other than an attempt to convey the depiction from Mainz (Figure 9.4) as accurately as possible, there is no explanation for this displacement. However, saddles of another type are depicted on Bosporan reliefs with flattened semi-circular supports bent at a right angle to the centre and rising directly from the edge of the saddle cushion (view from the end face). On relatively flat reliefs end faces of back supports are schematic, of the same thickness but on more pronounced reliefs the supports appear more realistic and are wider at the bottom (Figure 9.1–3).

The incline of the pommel reduces its stability and the cantle is too flat. The author aligned the edges of the bars with the edges of the cushions. As a result, the gullet in the saddle turned out to be one and a half to two times wider than normal, i.e. 16 cm as opposed to 8–10 cm, so the bars do not sit in the optimal way on the horse's back, and a saddletree such as this does not fulfil its basic function of lifting the rider above the horse's spine. None of the existing saddletrees, from Turkic to modern examples, have such defects. The distinct gullet of optimal width between the saddle cushions was already a feature of Scythian saddles, to say nothing of later ones. As a result, John Duckham, who tested the reconstructions, noted the damage to the horse's back and the instability of the saddle with the increased thickness of the soft lining beneath it.[57]

Despite all these inconsistencies, Peter Connolly's conclusions on the construction of Roman saddles

[51] Connolly 1986; 1987; Connolly and van Driel-Murray 1991: 33–50, figs 5b, 6, 8, pl. VI; van Driel-Murray *et al.* 2004: 12–19, figs 3, 5, colour figs 1–3.
[52] Bishop 1988; Hyland 1990: 130–36, figs 5–8; Junkelmann 1992: 34–74, figs 65–79.
[53] van Driel-Murray *et al.* 2004: 10.
[54] van Driel-Murray *et al.* 2004: 19–20, figs 3, 5.
[55] Connolly 1986: fig. 11; Connolly and van Driel-Murray 1991: figs 1–2.
[56] I know of no saddletree with such an angle of declivity of the pommel. It is usually perpendicular to the bars and has a deviation towards the outside in the upper part.
[57] van Driel-Murray *et al.* 2004: 20.

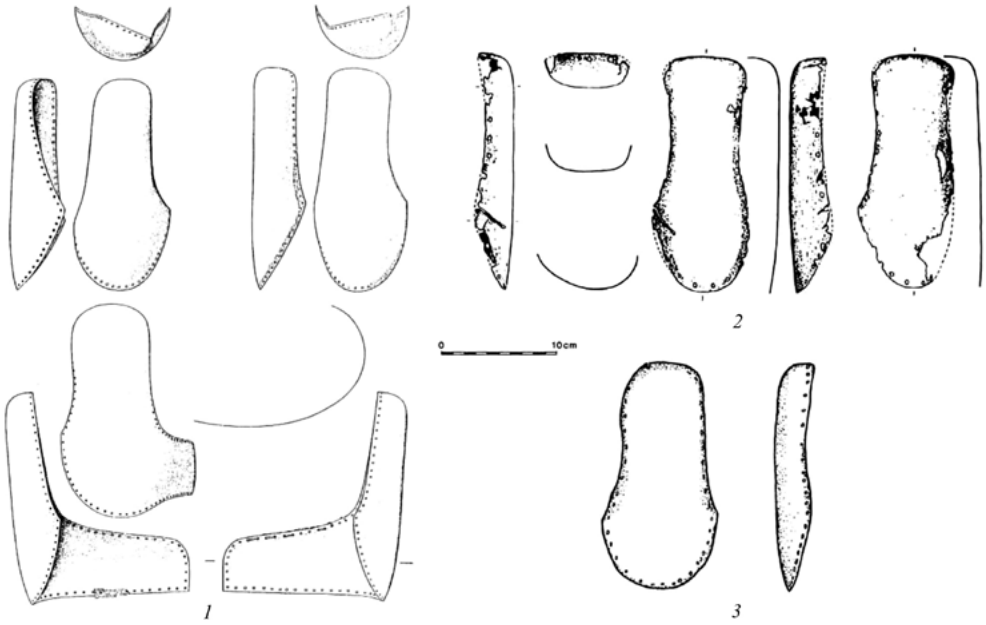

Figure 8. The overlays for the supports of the Roman saddles: 1, Newstead (Connolly and van Driel-Murray 1991: fig. 7); 2, Rottweil (Vujovic 1995: fig. 3); 3, Boljetin (Smorna) (Vujovic 1995: fig. 1)

and the presence of an inner framework have not only been supported by many researchers but have also been extended to other varieties of saddles, namely Sarmatian, Parthian and Sasanian. However, the actual variety of saddles with four supporting elements in depictions from the late centuries BC to the early centuries AD cannot be limited to Roman 'horned' saddles. Different views have been advanced in the literature. To Hubertus von Gall 'the Bosporan saddle appears from its construction to be made of a hard material, probably wood', and soft saddle cushions (*Sitzpolster*) with knee rolls (*bauschen*) can be seen on a vessel from Kosika.[58] Vladimir Goroncharovsky relates the depiction on the gravestone of Phallon, son of Pof, to 'leather' Roman horned saddles, that on the stele of the sons of Pantaleon to Parthian saddles (both monuments are from Gorgippia), and the remaining saddles on Bosporan reliefs to a local type of 'deep rigid saddle' characterised by 'prominent round projections bent inwards to the shape of the thigh' and 'vertical projections' at the back. In addition, he posits that they had cantles, referring to a fragment from Temryuk Museum.[59] However, the saddles on all these reliefs have the same features (semi-circular supports, saddle cushions with a prominent flaps, stitched sweat cloths of the same shape, the absence of saddlecloths, bunches of strings on the saddle) that are characteristic of Bosporan saddles in general and can be related to saddles of the Scythian type. Valery Nikonorov thinks that the Parthians used 'rigid saddles with pommels and cantles' along with the 'horned' saddles that the Romans borrowed from them.[60] Alexander Simonenko suggested that Sarmatian saddles from the 1st century had a rigid frame, and that 'Roman and Parthian "horned" saddles with four projecting bows' belonged to another type of saddle, new in comparison with the Scythian type.[61] Moreover, in the latest edition of 'Sarmatian Horsemen' he allowed for the possibility that the Sarmatians in the 1st–2nd centuries were using saddles, similar to the Maremma saddle, with bows fixed on the top of pad-saddles instead of the bars.[62] However, on all Bosporan reliefs of the 1st and early 2nd centuries, we still see saddles with four semi-circular supports, similar to the saddle of Scythian type.

Were Sarmatian or Parthian saddles similar to Roman ones? They are most similar to saddles depicted on a group of provincial Roman Rhenish reliefs with attacking horsemen, which in fact depict Sarmatian saddles.

Sasanian saddles

Sasanian saddles began to be represented on depictions when Roman ones disappeared – they are known only from depictions (Figure 10). They appear on rock reliefs with scenes of triumphs and investitures at Tang-e Ab, Firuzabad, Naqsh-e Rustam, Taq-e Bostan, Darab and Bishapur, and also on silver dishes from the 3rd and 4th centuries. As a rule, though, the saddle cushions are not visible and only the elongated narrow front supports are shown, encompassing the rider's thigh in the shape of a flat petal bent inwards. Other evidence for the flattening of the supports is the decorative piping around their perimeter which is shown on many depictions, for instance on saddles on a relief from Tang-i Ab depicting the victory of Ardashir I over

[58] Von Gall 2002: 407.
[59] Goroncharovsky 2003: 43–48.
[60] Nikonorov 2001: 116.
[61] Simonenko 2010: 231–32, 227, n. 11.
[62] Simonenko 2015: 303–306; Stepanova 2011; 2014.

Figure 9. The depiction of pad saddles of the Scythian type on Bosporan (1–3) and Rhine reliefs (4–6), 1st century, and replica of the Scythian saddle from Pazyryk kurgan 3 (7–9): 1, stela of Charitonis, son of Mocha (Davydova 1990: cat. 47); 2, uninscribed stela from the Nymphaeum necropolis (Davydova 1990: cat. 54); 3, stela of Julius Patius, son of Demetrius (Desyatchikov 1972: fig. 4); 4, gravestone of Gaius Romanius from Mainz (Heintze, Kraus and Sichtermann 1967: fig. 192a); 5, anonymous stela from Cologne (*Roman Art* 1984: fig. 37); 6, stela of Titus Flavius from Cologne (Noelke 2006: fig. 34)

Artabanus IV (AD 230s), and the saddle of the heir to the throne on a double relief of Varahran IV (AD 388–399).

Apart from the flattened supports, a number of other features of Sasanian depictions are similar to those of their Parthian predecessors: for example, there are no saddlecloths on early Sasanian reliefs and withers straps may be shown on the breast bands and going off at right or acute angles (for instance, on the triumphal reliefs of Shapur I). The usual decorations of the breast bands are phalerae and large round plaques, including pendant plaques. Sometimes the plaques cover all the straps of the breast band, including the withers straps (for instance, on Shapur I's horses on the triumphal reliefs in Darab and Bishapur).

On a relief in Bishapur depicting the coronation of Shapur I (AD 240–272) a riderless horse, possibly belonging to the king himself, has a saddle without a shabrack, with a prominent flap and with both the front and rear edges of the cushions slightly raised and folded inwards. The shape of the supports is not entirely clear on account of the poor state of preservation. In general, this saddle from Bishapur IV is similar to depictions of Parthian saddles.[63] The breast band and crupper are decorated with floral rosettes and a large tassel-pompon is attached to the rear of the saddle.[64]

[63] Herrmann 1989: pl. XVb.

[64] Hanging tassel-pompons are a characteristic element of the decoration of Sasanian saddles. They are depicted on reliefs, toreutic

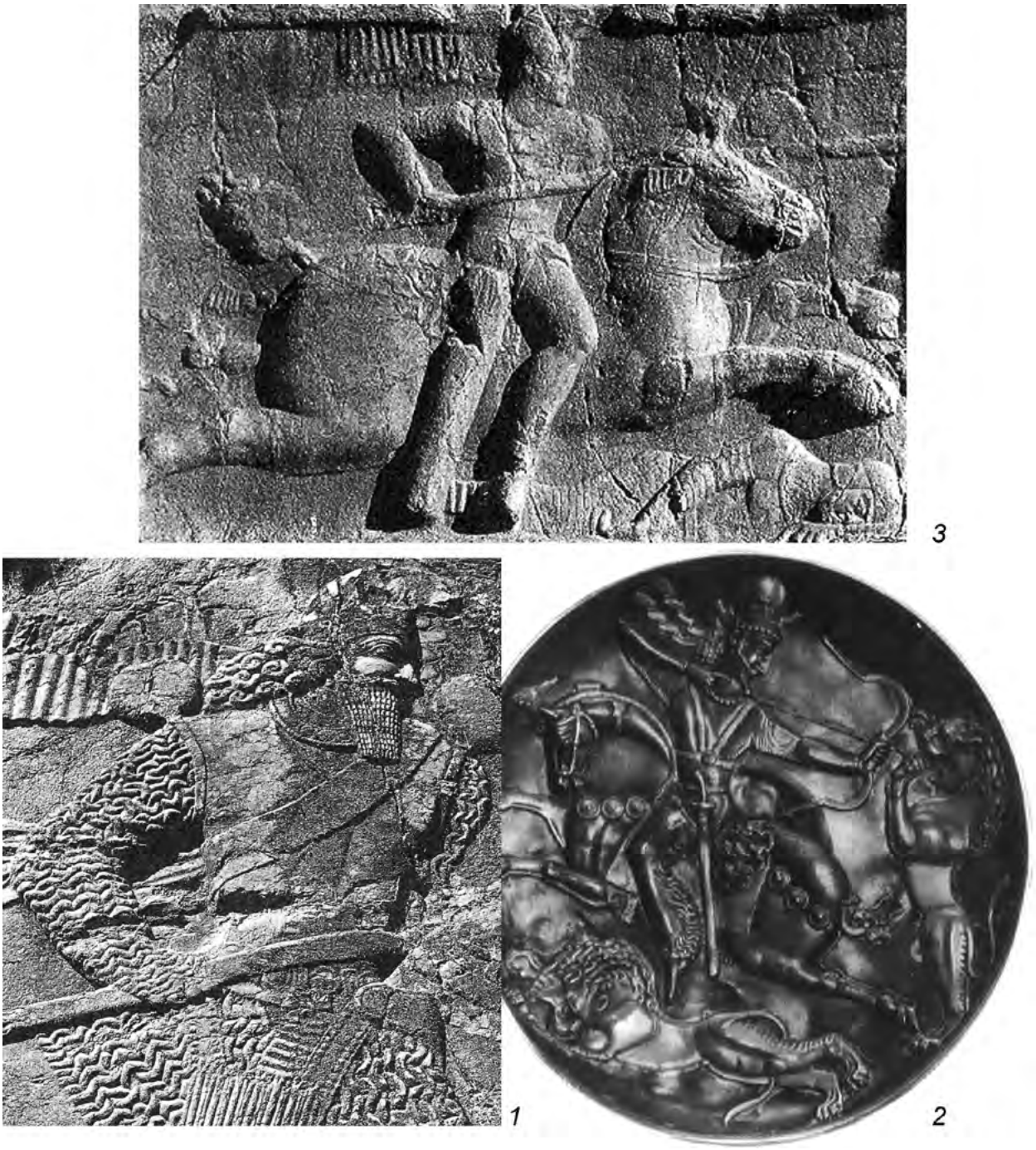

Figure 10. Depictions of Sasanian saddles: 1, relief of Shapur I, Firuzabad (AD 240–272) (von Gall 1990: fig. 8); 2, silver dish of Shapur II (AD 309–379) (Trever and Lukonin 1987: fig. 8); 3, relief of Varahran IV (AD 388–399), Naqsh-e Rustam (von Gall 1990: fig. 11)

If we compare Parthian with Sasanian depictions, we find that on the first triumphal Sasanian relief made in AD 226, i.e. shortly after Ardashir I's victory over Artabanus IV, both victors and vanquished have saddles with different supports and decorative elements from those of the preceding Parthian period. This may reflect delayed iconography as the changes in the construction of Parthian saddles were only recorded on Sasanian reliefs and toreutics from the second quarter of the 3rd century, but those changes are sufficiently significant to conclude that a new type of pad-saddle was introduced.

The Sasanians returned to the use of large rectangular shabracks (similar to Achaemenid horsecloths), which had been almost forgotten during the Parthian period. A saddle covered with a rectangular saddlecloth with

and on drawings of horsemen in the 'House of Frescoes' at Dura (Europos).

slits for the supports can be seen on a rhyton in the Cleveland Museum of Art.[65] The support elements are short, have oval bases oriented across the saddle, i.e. flattened, but are relatively narrow. The front supports are taller and slightly bent inwards. The breast bands have withers straps and phalerae. All the 4th century dishes with scenes of royal hunts show rectangular saddlecloths and breast bands without withers straps. The breast bands and cruppers can be decorated with a fringe, phalerae or hanging discs. A comparison of Sasanian and Roman saddles reveal some interesting results. On a relief from Thessaloniki of AD 297 or 305 depicting the battle of Galerian against the Persians, the emperor and his opponent are shown with horsecloths made of animal skins.[66] On a relief illustrating the victory of Shapur I (AD 240–272) over the emperor Valerian the Roman horse (Bishapur III) has virtually the same saddle as in the scene of Shapur I's coronation (Bishapur IV), with small differences mainly in the decoration. The 'Roman' saddle has pendants in the shape of trefoils on the simple straight breast band and crupper with no fork on the fasteners, and on the horse presumably belonging to the Persian king a similar breast band and crupper are studded with floral rosettes. Both reliefs are in poor condition and the relief in Bishapur IV is not even complete. It is therefore only possible to get a very general idea of the saddles – there are neither saddlecloths no shabracks, the Sasanian saddle cushions have more pronounced flaps, the Roman cushion is virtually identical in width, the front and rear edges of the saddles are slightly raised and bent inwards, and on top, at least on the Roman horse, they appear to have some extra projections, contoured in the base. It may be that there is a similar saddle on the Persian king's horse, but it is impossible to be certain of this in view of the relief's incompleteness and poor state of preservation. In general, the Sasanian saddle is similar to Parthian depictions.[67]

The projections which can be seen on the Roman saddle are very interesting. Georgina Herrmann describes them as 'arches', as in her description of Scythian saddles: 'it is difficult to determine whether the four horns are replaced by raised arches at the front and the rear or whether this is another way of depicting Roman horns. These arches or horns cut through the leather covering'.[68]

The Sasanian saddle has one girth with a buckle and the Roman one has an extra narrow strap running from the rear of the saddle cushion at an angle to the girth. There is a ring (?) at the place where they meet and another ring or buckle below it. Similar oblique straps are encountered more frequently on pack-saddles, for example on some late Assyrian reliefs. Some modern saddles have a way of fastening the girths to rings hung by straps attached to the saddle.[69] These elements have not been noted in other depictions of Roman saddles.

On a Sasanian cameo dating to around AD 260 with a scene of the capture of Valerian by Shapur I each protagonist has an identical saddle: lacking saddlecloths, the saddle cushions and rear supports are concealed by clothing and the front supports curve over the thighs in the form of narrow strips. The only difference between them are in the decoration: the tassels on Shapur's saddle and the bridles. Valerian's saddle has no decorative elements.[70] The saddles on 3rd and 4th century Sasanian reliefs with battle scenes in Firuzabad and Naqsh-e Rustam and on a dish with the scene of a lion hunt of Shapur II (AD 309–379) are depicted in the same manner. Along with narrow support elements one finds depictions with fairly wide supports, for example on a relief of Hormizd II at Naqsh-e Rustam.[71] Judging by the proportions of the depictions, their height may have been 10–12 cm.

On a medallion of Valentinian I and Valens (AD 364–375)[72] the front support is shown leaning on to the shoulder of the horse in the same way as on Roman depictions of 'Greek' ('Scythian') saddles, but it can still be seen that it is significantly narrower than the front of the cushion. At the back the cushions are rectangular (as on the above-mentioned relief from Saint-Rémy and on the cameo with the hunting scene of Alexander the Great), the breast band and crupper reach the saddle in the area of the supports; there is no saddlecloth. I will venture a suggestion that the front element of this type of saddle cushion may have been similar in shape to two fragments of saddle covers from Carlisle – a lower lens-shaped part of the same dimensions as similar details of Scythian saddles, with a narrow projection of 12 cm above it (Figures 2.1, D 5, D 8).[73]

There are no depictions of saddles with narrow flattened supports from later than the 4th century. No support elements at all are shown in many 4th–6th century Sasanian depictions. However, on some 4th–5th century dishes details that are very similar to the semi-circular front supports of Scythian saddles can be seen in slits in the rectangular saddlecloths: for example, on dishes depicting argali hunts – of Shapur II (from the Pereshchepina treasure, State Hermitage Museum, St. Petersburg) and Peroz (Metropolitan Museum, New

[65] Herrmann 1989: pls VI–VII.
[66] Heintze, Kraus and Sichtermann 1967: fig. 251.
[67] Herrmann 1989: pl. XVa–b.
[68] Herrmann 1989: 768.
[69] For example, on the McClellan saddle or cowboy saddles (Simonenko 2010: figs 184–85).
[70] Heintze, Kraus and Sichtermann 1967: fig. 386c.
[71] Von Gall 1990: figs 6–13; Herrmann 1989: pl. XIVa–b; Trever and Lukonin 1987: 107, cat. 3, figs 8–9.
[72] Heather 2008: cat. 72.
[73] In his reconstruction of a Roman saddle Peter Connolly used the more widespread version in the shape of a horn or a semi-oval (van Driel-Murray, Connolly and Duckham 2004: fig. 5).

York), a wild boar hunt of Shapur II and a lion hunt of Varahran V (?) (British Museum, London). They can also be seen on dishes of Khusrau II (?) depicting the king on a hunt (Bibliothèque Nationale, Paris) and in the company of four grandees (State Hermitage) (on the last dish there is a scene of an argali hunt in the lower register). These drop-shaped elements have the edges delineated by extra lines or hatching. As opposed to the pommels of rigid saddles on 7th–8th century dishes, which are depicted in the shape of arches over the horse's withers, these do not go beyond the line of the withers, i.e. they are side supports.[74] Iranian dishes of the 7th century with hunting scenes feature rigid saddles of the Turkish type with prominent pommels and visible ends of the bars, but with no projecting support elements. Besides, for some time stirrups were not shown and the rear part of the saddle was traditionally concealed by clothing. Stirrups began to be depicted only in the 8th century.[75]

In summing up this survey of saddles of the Hun-Sarmatian period with four pronounced support elements, I should like to follow Georgina Herrmann in pointing out the great variety of shapes of these saddles in comparison with the Scythian period. I presume that all saddles with four elements were pad-saddles.

Saddles with wooden bows

No remains of saddletrees from Bosporan, Parthian, Roman or Sasanian saddles have yet been found. In all depictions, including sculptures, there are no external features of saddletrees (i.e. bows or prominent ends of the bars). The saddles are depicted flat, tightly pressed to the horse's spine, and often only the front, taller supports are visible under the riders.

Great progress was made in the development of equestrian equipment by the invention of saddles with wooden bows at the end of the 1st century BC/ beginning of the 1st century AD, but they had nothing in common either with Peter Connolly's reconstruction or with saddles of the 16th–20th centuries with concealed frames. In central Asia they were based on Scythian-type saddles and still featured some elements of local late Scythian decoration. The earliest finds of saddlebows have been in the Xiongnu graves. A saddle bow from the Tsaram barrow in Transbaikal, found *in situ*, had rounded outlines and consisted of two slats fastened by a strap. It was lying on decayed leather, under which were found the two aforementioned silver lens- or pear-shaped overlays, as well as two phalerae depicting goats – evidence of the use of breast bands with withers straps.[76] The bows from barrow 6 at Noin-Ula (Mongolia) – eight examples from four saddles – also consisted of two thin (c.1 cm) slats bound by straps (Figure 11.1).[77] They are identical to the saddlebow from Tsaram in size and proportions.[78] A silver-leaf pear-shaped overlay and a phalera come from the same barrow, but with a depiction of a yak.

The shape, relative fragility and slipshod decoration of these items,[79] and the absence of any obvious traces of fastening to the base, considering the fragments of the upholstery and the wooden nails (in Noin-Ula) which fastened the upholstery on the bows only on one side, suggest that they had a shape-forming rather than constructive function. It is probably these saddles that are depicted on the eastern Han bronze statuettes from Leitai: they have short trapezoid or semi-circular bolsters in front of and behind the saddle cushions.[80] The small rectangular holes of 0.5 x 1.0 cm in the saddlebows from Noin-Ula and Tsaram – one on each side of the pommel and two on each side of the cantle – were used to fasten the breast band and crupper straps to the supports. We can see holes of a similar size and shape in later segmented metal overlays on the bows of Far Eastern saddles of the 4th–6th centuries (Figures 11.8-10, 13).

The saddlebows from barrow 2 of the Kenkol burial-ground in Kyrgyzstan (Figure 11.2) are already entirely wooden, fairly massive and bow-shaped with apertures along the whole bottom edge, except the central parts above the saddle gullet.[81] Judging by their size and shape, the bows were attached above the semi-circular supports of Scythian-type saddles. The barrow dates from no earlier than the 3rd century.[82] Depictions of these saddles can be seen on 3rd–4th century funerary statuettes of the Wei and Western Qin dynasties from Xigou, Luoyang and Sechuan, China. The semi-circular supports and short arch-shaped saddlebows are clearly visible, as well as the characteristic gaps between the supports in the centre. The lower edges of the saddle cushions have triangular outlines (like the saddles from Tuekta or Pazyryk barrow 1), with additional rectangular leather flaps hanging from them on straps[83] (Figure 12).

[74] Trever and Lukonin 1987: 62–63, 73, 77–78, 107, cat. 2, figs 6–7, 19, 26, 48, 58; Herrmann 1989: pls XVI–XVII.
[75] Trever and Lukonin 1987: cat. 10–12, figs 20–21, 22–23, 34–35.
[76] Minyaev 2009: 57, figs 14–15.
[77] Rudenko 1962*a*: pl. XXIV.3.
[78] Minyaev and Stepanova in press.
[79] The saddlebows from Noin-Ula are not strictly symmetrical and are roughly worked. However, these details were not visible under the leather with a thick woollen nap with which they were upholstered on one side (Rudenko 1962*a*: 58–59). The saddlebows from Tsaram were covered with leather with embroidered woollen threads, also on one side.
[80] Gan Bowen 1972: fig. 2.8.
[81] Bernshtam 1940: pls IV, XXVI. Only one saddlebow is mentioned in the publication. To all appearances, at the time of writing the second was in fragments and had not yet been restored. Both saddlebows are currently in the State Hermitage Museum, St. Petersburg.
[82] Torgoev 2009. I am grateful to Asan Torgoev, curator of the Kenkol collection in the State Hermitage Oriental Department, for the opportunity of examining materials from the burial and for his valuable consultations.
[83] Brinker 2007: fig. 7; Wang Wei 1997: fig. 1.3; Liu Han 1959: fig. 1.6; Gansu Sheng Wenwu Kaogu Yanjiusuo 1996: fig. 42.1, cover

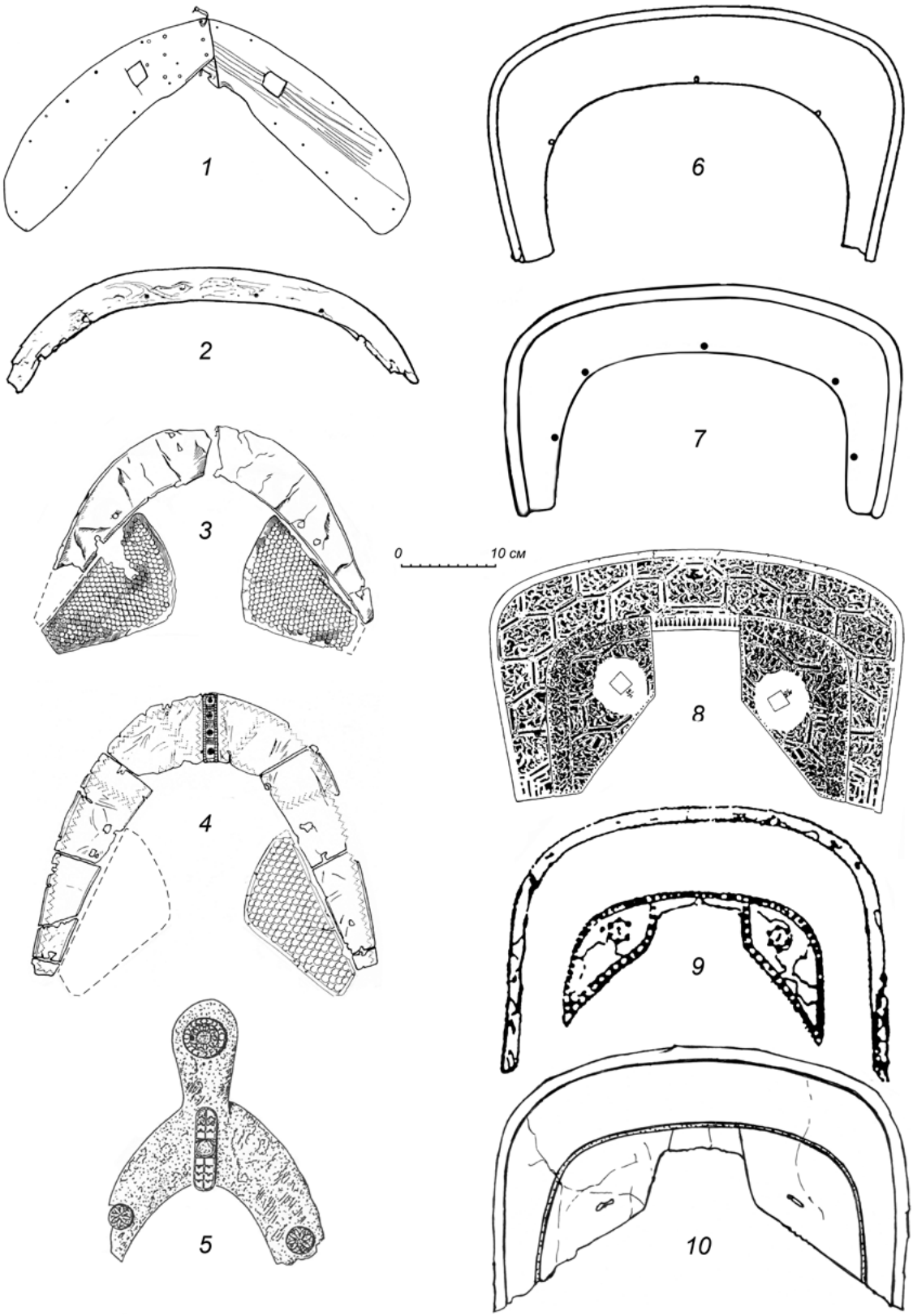

Figure 11. The front bows of the saddles of the 1st–first half of the 6th centuries: 1, wood, Mongolia, Noin-Ula, kurgan 6 (author's drawing); 2, wood, Kyrgyzstan, Kenkol kurgan 2 (author's drawing); 3, gold, Novogrigorievka burial IX (author's drawing based on Zasetskaya 1994: table 2.7, 10); 4, gold and carnelian, Melitopol (author's drawing based on Zasetskaya 1994: table 7.3, 9); 5, wood and gold, Nubia, Ballana, the burial ground of a 'princess' (Zasetskaya *et al.* 2007: 72, fig. 25.4); 6, wood, China, Anyang burial 154 (Zhongguo Shehui Kexueyuan Kaogu Yanjiusuo Anyang Gongzuodui 1983: fig. 4); 7, wood, China, Beigou burial 8 (Wang Wei 1997: fig. 3.2); 8, wood and gilded bronze, China, Chaoyang, burial 88 (Liaoning Sheng Wenwu Kaogu Yanjiusuo and Chaoyang Shi Bowuguan 1997: fig. 22.25); 9, gilded bronze, Korea, Juityang burial 3 (Wang Wei 1997: fig. 25.7); 10, iron, Japan, Singaj burial 1 (Nihon bagu taikan 1990: fig. 10)

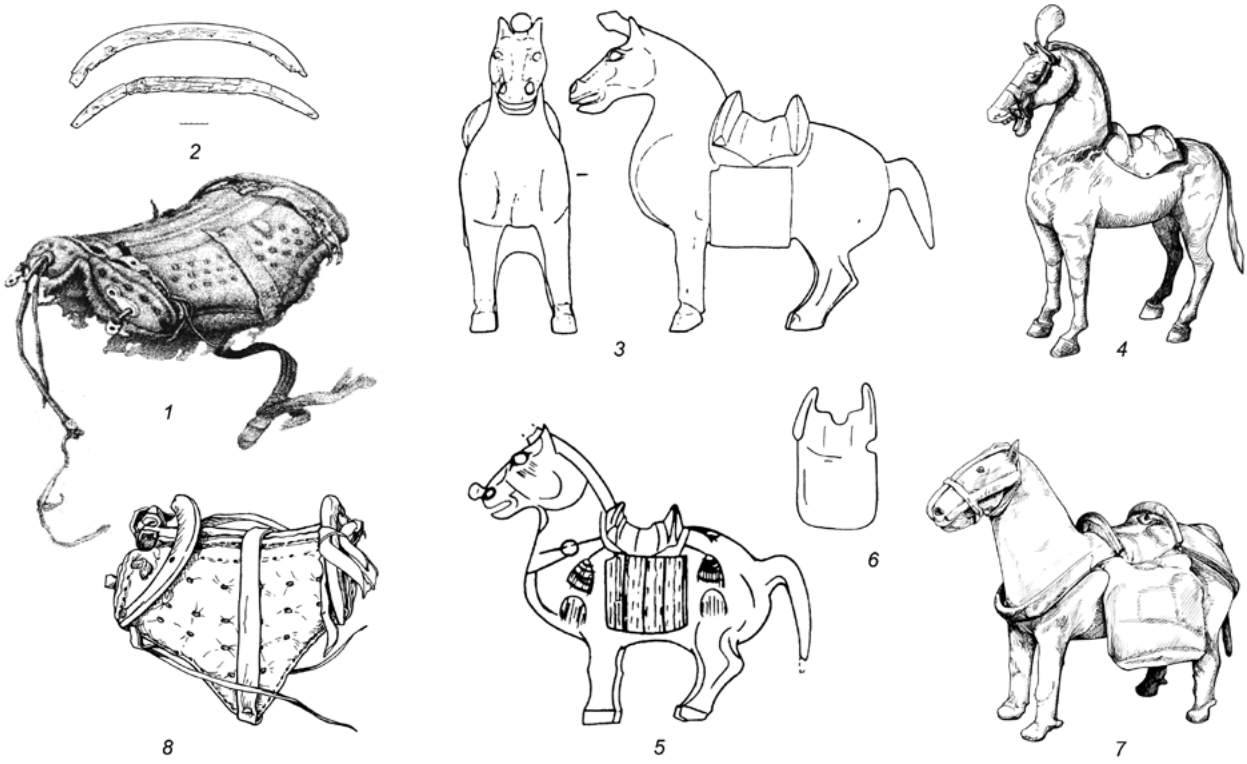

Figure 12. The pad-saddle and the saddles of 3rd–5th centuries with semi-circular bows from eastern Asia: 1, leather and wool pad-saddle of Scythian type from Subashi-1, burial M10 (Liu Yunghua 2002: fig. 154); 2, wooden bows, Kenkol, kurgan 2 (author's drawing); 3–7, figurines with the depictions of the saddles (3, ceramic, Singyuan; 4, bronze, Xigou burial 5 (Gansu Sheng Wenwu Kaogu Yanjiusuo 1996: drawing based on the photograph from the cover); 5, ceramic, Luoyang, burial 1568 (Luoyang Shi Di'er Wenwu Gongzuodui 2000: fig. 2.7); 6, ceramic, Luoyang (Liu Han 1959: fig. 1.6); 7, ceramic, Neihua (Xuzhou Bowuguan 1999: based on the cover photograph); 8, leather, wool and wooden model of the saddle from Loulan Gucheng, burial 1 (Wieczorek and Lind eds 2007: cat. 146, based on a photograph)

The sag of the soft base formed by the tightening of the girth has been painstakingly reproduced, as well as the corresponding slight inward tilt of the supports with attached saddlebows. Chinese historians refer to these as 'saddles with concave seats' and trace in them a link with western Han pad-saddles.[84] On these, as in earlier Han examples, the breast bands are fastened to the supports. There are still no stirrups on these saddles.

A model of a similar saddle, only 13 cm long but superbly conveying the characteristics of the original, with quilted leather cushions and arch-shaped saddlebows fastened to the supports by straps, was found in Grave 1 of the Loulan Gucheng burial-ground in Xinjiang[85] (Figure 12.8). The burial dates from the Eastern Han / Western Qin period (AD 25–420). The cushions have somewhat exaggerated triangular bulges, the girth strap is fastened above them, and on the inner sides of the supports, to all appearances, there were additional cross straps like those on Scythian saddles (fragments have survived). Even the saddle-strings are shown.

The next stage was saddles with tall П-shaped vertical bows, whose appearance in the late 3rd or early 4th century is linked with the Xianbei. They were widely used in China, subsequently in Korea and Japan, and existed until the end of the 6th century. Early examples of this type (from Grave 154 at Anyang and Grave 8 at Beigou) had no metal decoration on the saddlebows (Figure 11.6–7). Later flat wooden П-shaped bows began to be covered with tracery bronze or solid iron and bronze overlays on the outside and along the top. Paired segment-shaped overlays of the same materials were attached to the bottom of the bows, arranged vertically.[86] The distance between them corresponded to the width of the saddle gullet (Figures 6.9–11, 11.8–10). In a lighter version a metal strip covered only the top of the saddlebow. However, the paired bronze overlays, usually gilded, as in the case of a full set, were contoured by a narrow metal strip and were fastened to the lower perimeter of the saddlebow[87] (Figure 6.9). In this case the segment-shaped overlays, unlike the flat П-shaped overlays on the saddlebows, usually had

photograph; Luoyang Shi Di'er Wenwu Gongzuodui 2000: fig. 2.7, cover photograph.

[84] Liu Han 1959: 100; Wang Wei 1997: fig.1.

[85] Wieczorek and Lind eds 2007: cat. 146.

[86] Wang Wei 1997: fig. 25.2, 4–6, 8–10; Liaoning Sheng Wenwu Kaogu Yanjiusuo and Chaoyang Shi Bowuguan 1997: figs 17–19, 22–25; Nihon bagu taikan 1990: figs 1–3, 6, 10–11, 24–25 etc.

[87] Nihon bagu taikan 1990: figs 34, 39, 54, 133–134 etc; Dong Gao 1995: fig. 3; Wang Wei 1997: fig. 25.7.

a slightly convex shape. These decorative elements were evidently a continuation of the development of the overlays on the semi-circular supports on Pazyryk and Hun saddles (Figure 6). Characteristically their parameters do not exceed the average dimensions of the supports on Scythian saddles, i.e. 12–15 cm in height and 20–22 cm in length. Holes were usually punched in the front and rear overlays for fastening the buckles for attaching the breast bands and cruppers – a continuation of the Western Han tradition.

Fastening holes were punched in the lower edge of the П-shaped wooden saddlebows, as on the examples from Kenkol. There were no holes on the lower ends of the forks of the bows, and on some Japanese saddles the forks even had edging.[88] Let us examine in more detail the particulars of attaching overlays to the saddlebows and the bows themselves to the saddle, using a saddle from the area around Chaoyang as an example.

Grave 88 near the settlement of Shirtai near Chaoyang, China, excavated in 1988, belongs, in the opinion of those who carried out the excavation, to a noble of Xianbei and relates to the period of the Former Yan dynasty (AD 337–370). The wooden saddlebows and the gilded bronze overlays on them had survived (Figure 13). The bows were faced with bronze overlays matching their shape on both sides – smooth on the inside and tracery on the outside.[89] Also, a narrow strip of wood around the perimeter of the saddlebows' inner arches was free of metal, with the exception of the middle part on the outside, equal to the width of the saddle gullet, which was covered by a protuberance in the tracery plate (Figure 13.5). Along the outside edge of the saddlebows was a bronze strip, П-shaped in cross-section, which pressed on the edges of the inner and outer overlays and fastened them to the bow. Pairs of segment-shaped tracery overlays were fixed along the inner edge of the bows from the outside. They covered the strip of wood and the bottom edge of the П-shaped tracery overlays (Figure 13.2, 4–5). After the П-shaped and segment-shaped overlays had been joined, small round holes were made to attach the saddlebows to the base. These holes ran through the saddlebow and the strip where the П-shaped and segment-shaped overlays had been applied, but since the inside edges of the П-shaped plates were not visible under the paired outer overlays, the holes partly missed them (Figure 13.5).

On later saddles the fastening holes on paired overlays are not visible at all. They were evidently made before the overlays were attached and appeared only on the inner edge of the wooden saddlebows, which was free of metal. In Chaoyang thin metal strips for edging the paired overlays along their perimeter had either not survived or had never existed, though there is a series of small holes for fastening. Later saddles usually have these strips.

On earlier saddles of the Xianbei type the outlines of the bottom of the paired overlays is fairly angular, while the ends of the bows are cut almost at right angles and do not emerge beyond the edge of these overlays, nor, therefore, beyond the limits of the support and saddle cushion (Figures 11.6–8). Saddles of the 3rd century have similarly cut and arranged semi-circular bows (Figure 12). However, the metal overlays were quite heavy, so corrections had to be made in their profile and the shape of the saddlebows in the lower part. On later saddles the ends of the П-shaped bows were cut at an acute angle and dropped substantially below the edge of the supports and the lower contour of the paired overlays was usually smooth, following the lines of the horse's body (Figure 11.9–10). On the whole, these saddlebows, in combination with the metal overlays, helped to fix the saddle safely on the horse's body and protect the rider as much as possible. As in the previous period, rectangular leather flaps were suspended from straps attached to the bottom edge of the saddle cushions.

Mounting a horse was very inconvenient because of the tall vertical saddlebows, and this led to the introduction of single-sided and double-sided footboards, which rapidly began to be used as stirrups.[90] Usually only the metal overlays (П-shaped and paired segment-shaped) and oval stirrups with high necks survive from these saddles. Even in graves where wooden saddlebows have been found (in Anyang, Beigou and Chaoyang, for example) the bars of the saddletree are missing.[91] The same applies to Japanese burials from the Kofun period (5th and 6th centuries). Even if wood from П-shaped saddlebows survives, the bars are missing in all cases.[92] Projecting ends of saddletree bars do not appear on a single depiction of saddles in the first half of the 1st millennium AD. Moreover, the features of saddlebows examined earlier exclude the possibility of their being attached to the bars.

The well-known reconstruction of a saddle from Anyang, made by analogy with modern Mongolian saddles, has no archaeological basis: only П-shaped bows were found in the burial.[93] The reconstructions

[88] Nihon bagu taikan 1990: figs 345, 347.

[89] Liaoning Sheng Wenwu Kaogu Yanjiusuo and Chaoyang Shi Bowuguan 1997: figs 17–19, 24.

[90] Vainshtein 1991: 220–21; Komissarov 2005.

[91] Zhongguo Shehui Kexueyuan Kaogu Yanjiusuo Anyang Gongzuodui 1983: fig. 4; Wang Wei 1997: figs 3–4; Liaoning Sheng Wenwu Kaogu Yanjiusuo and Chaoyang Shi Bowuguan 1997: 26–28.

[92] Nihon bagu taikan 1990: pl. 54, 398–99.

[93] Zhongguo Shehui Kexueyuan Kaogu Yanjiusuo Anyang Gongzuodui 1983*a*; Zhongguo Shehui Kexueyuan Kaogu Yanjiusuo Jishushi 1983.

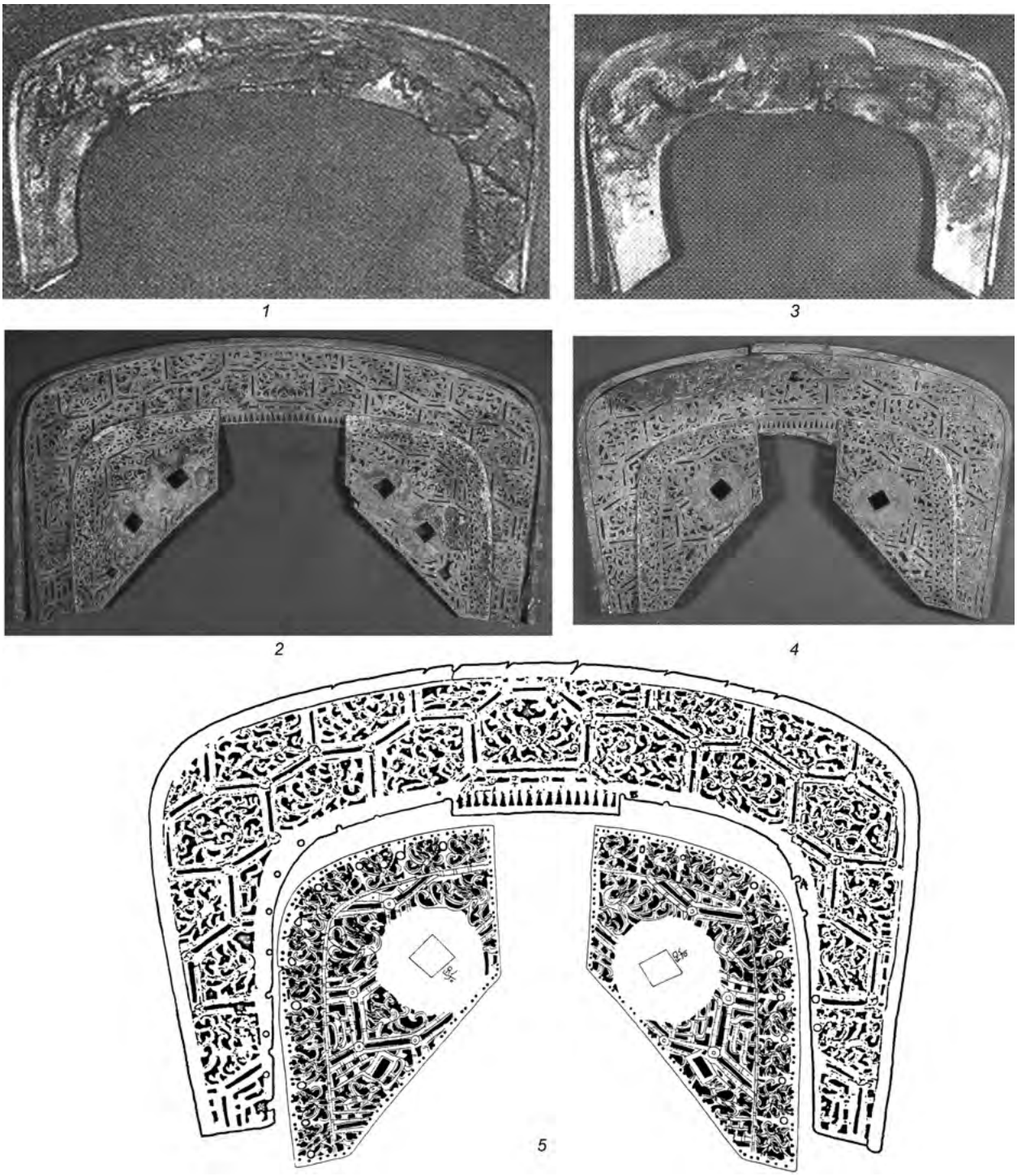

Figure 13. The saddle of the 4th century with П-shaped bows from Chaoyang: wooden bows (1, cantle, 3, pommel) and the gilded bronze overlays for the bows (2, 4–5); (1–5, Liaoning Sheng Wenwu Kaogu Yanjiusuo and Chaoyang Shi Bowuguan 1997: col. figs 1–2, figs 18–19, 22, 24–25)

of a similar saddle from the 'Heavenly Horse' tomb of the 5th to early 6th century in Xinmo and other Korean saddles of that type are much more convincing: on them the cushions of pad-saddles with semi-circular supports are used as bars, with the bows tied to them[94] (Figure 14.5–9).

There is a fine example of saddles like these on 6th century vessels from Silla, Korea[95] (Figure 14.1–4). The semi-circular supports with the saddlebows attached to them are precisely rendered. The pointed ends of the bows drop down lower than the edges of the saddle cushions. There are no overlays. The breast band is

[94] Yang Hong 1985: 87–95, figs 1, 11.

[95] Arapova ed. 2010: cat. 26.

Figure 14. The saddles of Silla (Korea) with П-shaped bows of the 5th to first half of the 6th century: 1–4, pottery vessels, Kŭmnyŏng-ch'ong, Kyŏngju (1–3, Arapova ed. 2010: cat. 26; 4, 5, gilded bronze overlays for the front bow, tomb of the 'Sky Horse' in Sinmo National Museum of Korea; 6–9, reconstruction of horse's harness (after Yang Hong 1985: figs 2, 11)

traditionally fastened to the supports. A trapezoidal saddle blanket can be seen under the saddle, evidently covered in leather. Additional rectangular leather flaps are hung on both sides of the cushions.

Similar large, thick, trapezoidal saddle blankets covered with leather were normally used with Japanese Samurai saddles. These rigid saddles have an external frame whose characteristic features are the ends of the forks of the saddlebows which protrude beyond the bars, making the saddle more stable. The saddle blankets serve to prevent the protruding parts of the saddlebows from coming into contact with the horse's body.

Saddles with bows appeared in the west approximately at the same time as in the east. Judging by the depiction on the handle of a 1st century cauldron from the village of Kilyakovka, they were also known to the Sarmatians.[96] Anatoly Ambroz, who once examined this find, posited that the saddle may have had a soft base.[97] Another depiction, this time of a saddle with only a cantle, comes from the layer 'of the middle to second half of the 3rd century, redeposited by a medieval dig' in the settlement of Artesian.[98] A saddle with a massive vertical cantle is depicted on the terracotta figure of a horseman. The pommel is not shown as there was no room for it: the figure of the horseman is too close to the horse's neck and his knees are resting on its shoulders. This position of the horseman, especially of his legs, has close analogies on Bosporan grave stelae, i.e. it comes from the tradition of depicting Black Sea region saddles of Scythian type without saddletrees. Clearly the iconography of the rigid saddle had yet to be established (the depiction of only the cantle is atypical). There are no traces of stirrups and the position of the legs does not suggest them. At one time I expressed my opposition to the dating of the statuette to the 3rd century.[99] The dating suggested by Nikolay Vinokurov now seems to me to be entirely possible as the Hellenistic traditions of portraying horsemen were strong and the format of conveying saddles with bows had not yet taken shape.

In general, there are fewer depictions of saddles with bows from the 1st to 3rd centuries in Europe and the Near East than in the Far East, and there have not as yet been any finds. This may be linked with the imperfection of early saddles with bows and the lack of perceptible advantages in their use over the later types of pad-saddles that were widely developed in the west.

However, if saddles with wooden bows were used, if only in part, by the European nomads, they were

[96] Simonenko 2010: 228, fig. 186.1.
[97] Ambroz 1992: 37.
[98] Vinokurov 2002: 74, figs 4–6.
[99] Stepanova 2004: 244–45.

probably also known to the Romans. It then becomes understandable why Hun saddles did not impress them at all. In Anatoly Ambroz's opinion, the relief on an arch of Theodosius I (AD 379–395) depicts a saddle with tall vertical bows, not the 'horned' Roman type.[100] Most evidence of the use of saddles with bows in Europe relates to the Hun period. European 'Hun' saddles of the 5th and early 6th century with tall semi-circular bows are similar in a number of respects to their contemporaries: saddles with П-shaped bows from southeast Asia. They also lack wooden bars. They have a similar set of overlays on the saddlebows (arch-shaped and pairs of segment-shaped) and a similar way of fixing them (with narrow metal strips and small nails) (Figure 11.3–4). An incomplete set of overlays, where there are only pairs of segment-shaped overlays on the supports and the bow itself has no metal covering, is also encountered on saddles with П-shaped bows. The overlays from Melitopol and Novogrigorevka (Graves VIII, IX) have the same apertures for tying on the inside as on the examples of saddlebows from Chinese and Japanese burials. However, there are also a number of differences: the lack of stirrups, the semi-circular shape of the saddlebows, the remains of only the pommels and the base of the overlays covered in gold foil is mostly not bronze but wooden. How important are these differences?

In the Far East in the 4th and 5th centuries saddles with semi-circular bows continued to exist alongside those with П-shaped bows. They are depicted on several statuettes – for example, on a Western Qin statuette from burial 21 near Changsha from 302 BC and on a statuette from Neihua from the Southern and Northern dynasties (AD 420–581).[101] On the latter statuette no stirrups are depicted (Figure 12.7). This may be because mounting on to this saddle with relatively short saddlebows did not present any problems. Some of the pairs of overlays from European burials had a bronze base (for example, from Leva and Novogrigorevka, Grave IX).[102] It is possible that Hun saddles came from Far Eastern examples from the 2nd and 3rd centuries, which did not yet have stirrups, i.e. that this is another line of development of saddles with tall bows, alongside the saddles from Xianbei.

In all, more than 20 complexes with similar details are known – from the steppes of southern Russia, the Volga region and the northern Caucasus to Hungary, Italy, France and Germany. Segment-shaped elements have also been recorded near lake Borovoye in Kazakhstan. Pairs of overlays usually had a stamped or repoussé ornament in the form of a 'scaly' pattern, a 'wave' or a network of rhombi. Arch-shaped overlays either had similar decoration or were smooth – in a burial near Melitopol they were decorated with a zigzag pattern.

Fragments of flat wooden arch-shaped pommels have been found in graves of the Hun period outside the European region, such as the burial in the Shamsi valley in Kirgizia and the burial of a 'princess' from the Ballana burial-ground (Nubia), but with none of the above-mentioned overlays.[103] The pommel from Ballana has a flat projection ('horn') in the middle and is decorated with round plaques made in the cloisonné technique (Figure 11.5), while the one from Shamsi is adorned with oval medallions with insets of red glass. In the centre of the pommel from Melitopol (on top of the arch-shaped overlays) and Ballana are narrow rectangular gold plaques with round insets. Round plaques and paired depictions of eagles, in the opinion of Kurt Horedt and Dumitru Protase, were placed on the pommel of a saddle from the Apahida 2 burial-ground of the Gepids in Romania.

Irina Zasetskaya, who has made a detailed analysis of saddle decorations in the Hun period, has proposed a classification of paired overlaps and has convincingly shown that their existence was limited to the period from the first half of the 5th century to the first half of the 6th century. The burial from Shamsi dates from the late 5th to early 6th century, the burial of the 'princess' from Ballana to AD 450–460 and the Apahida 2 complex to period D 3 (AD 450–480/490).[104] Judging by existing archaeological materials, it cannot be excluded that Hun saddles, in contrast to those from Xianbei, had only pommels, which is only possible with a soft base. In this regard, the graffiti on the wall of a neglected 1st–2nd century Roman house in Bruckneudorf (Austria) is of interest. Its date is not clear. It depicts a rider on a horse and a saddled horse trotting one after the other. On the saddled horse is schematically shown a patterned rectangular shabrack (?) with the girth moved to its front part, a breast band decorated with round plaques and a crupper with a pendant. At the front part of a saddle is a tall sickle-shaped projection, its upper part straightened and bent towards the inside of the saddle. A similar projection emerges from the front of the 'shabrack' on the saddled horse. It is thought that the horses have Roman formal trappings,[105] but there are no obvious details on the graffiti that provide evidence for this. The similarity of the front and rear supports is a characteristic of depictions of Roman horned saddles – even in profile depictions all four are usually shown.

[100] Ambroz 1992: 37, table VII.27.
[101] Vainshtein 1991: fig. 97.1; Xuzhou Bowuguan 1999: fig. 12.3, cover photograph.
[102] I am deeply grateful to Irina Zasetskaya, curator at the State Hermitage Museum, for clarifying this matter and other details concerning Hun saddles.
[103] Kožomberdieva, Kožomberdiev and Kožomjako 1998: figs 7.2, 8.5; Zasetskaya *et al.* 2007: 72, fig. 25.4.
[104] Horedt and Protase 1972: fig. 10; Zasetskaya 1994: 46–49, 200–201, figs 9–10; Zasetskaya *et al.* 2007: 62, 72, 79–81, 142–146, fig. 21.3, 6, 25.4–5, 55–56.
[105] Daim, Kaus and Tomka eds 1996: 64, 131, cat. 3.58.

Features in the graffiti, such as the exaggerated single projections in the front part of the saddles, make it possible to propose these are saddles with a tall pommel shown in profile and are of the Hun type or something similar.

In four horse burials in a burial-ground by the river Dyurso near Novorossiysk, in the north Caucasus, pairs of segment-shaped overlays were recorded *in situ* on the horses' backs. There were no arch-shaped overlays. Each saddle had an ovular girth buckle. The way the pairs of overlays had been arranged and the slight traces of wood beneath them led Alexander Dmitriev to interpret these decorative elements as 'projecting parts of the saddletree' of a rigid saddle.[106] For his reconstruction of Hun saddles he used Sevyan Vainshtein's drawings of ancient Turkic saddles from the Kokel burial-ground.[107] Dmitriev's conclusions were supported by well-known researchers: Anatoly Ambroz, Irina Zasetskaya, Valery Nikonorov and others.[108] Ambroz agreed with this opinion, although he had previously thought that pairs of segment-shaped overlays, with no overlays on the saddlebows, were characteristic of Scythian and Hun pad-saddles.[109] However, a comparison has shown that the pairs of overlays on Hun saddles are substantially wider than the frontal projections of the bars on ancient Turkic and later saddles with a rigid frame (15–20.5 cm against 8–14.5 cm) but correspond fully to the dimensions of the overlays on Scythian and Hun saddles and later examples from the 4th to 6th centuries with П-shaped saddlebows (Figure 6.6–7).

Saddlebows of the Hun period also differ markedly from the pommels on ancient Turkic saddles in size and shape (Figure 15.10–12).[110] The characteristic fastening holes on the arch-shaped overlays from Melitopol and Novogrigorevka (Graves VIII, IX), from Kenkol and on П-shaped bows from the Far East make it possible to claim that these saddlebows did not stand on their butt-ends but rested with almost all of their inner surfaces on a circular support and were tied to it by straps.

The recent find of a saddle in burial 33 at the Kichmalka II burial-ground in the northern Caucasus (excavated by Ekaterina Vasilieva in 2010) helps to clarify the means by which pairs of overlays were attached to the saddlebow. The archaeologist dated the burial to the late 5th to early 6th centuries.[111] The parts of the saddle that have been preserved are decayed organic material, small fragments of a wooden pommel and paired segment-shaped overlays, which are thin wooden boards covered with gilded silver leaf with a scaly ornament. The overlays had been fixed by bronze nails with gilded silver heads along the bottom of the saddlebow, i.e. placed vertically and were attached in the same way as the overlays on saddles with П-shaped bows.[112] Similar decoration in the form of closely-packed nails around the whole perimeter of the pommel have also been recorded in Shamsi.[113] There are also nails with decorative heads among the artefacts from the second horse attire from Morskoy Chulek in the lower Don Basin.[114]

It may be a similar row of nails with decorative heads that is shown on the pommel of the saddle of a cataphract on a very deep carved relief of the late 5th or 6th century from Taq-e Bostan. Apart from that, the pommel is decorated with small relief floral rosettes. The flat circular detail in front of the rider's leg is very reminiscent of a tall semi-circular support (the far side of this detail rests on the wall), but this decoration for supports is not at all typical and is close to the design of the pommels on Hun saddles with round or oval plaques with central insets and nails. There is no sign of a cantle, which also correlates to archaeological finds and depictions on the graffiti from Bruckneudorf. It is evidently necessary to agree with Georgina Herrmann and Anatoly Ambroz that this late Sasanian relief depicts this particular arch-shaped pommel. [115] This interpretation may also apply to the depictions on Sasanian silver dishes of the 4th–6th centuries mentioned above. These may also depict pommels attached atop the supports. We see no prominent arches as on later depictions from the 7th and 8th centuries as the space beneath the bows of Sasanian saddles is filled by the supports on which they rest.

In conclusion, saddles with just wooden bows (or single bow) appeared at the turn of the present era. The cushions of Scythian-type pad-saddles were used as bars. I propose to call such saddles semi-rigid as opposed to pad-saddles which had no wooden bars or bows and rigid ones which had a proper saddletree with wooden or metal bows and bars. The first real rigid saddles, invented no earlier than the first half of the 6th century, were Turkic. Their bars reproduced in wood the cushions with bulge-flaps of semi-rigid saddles which remained as a legacy of Scythian saddles. It would be almost another four centuries before these wooden flaps on bars were finally dispensed with, and the modern type of narrow boards with long parallel sides appeared. Turkic saddles, in turn, are the forerunners of all modern saddles with rigid frames.

[106] Dmitriev 1979: 220–21, fig. 5.
[107] Vainshtein 1966: figs 40–41.
[108] Ambroz 1979; Zasetskaya 1994: 45; Nikonorov 2002: 294.
[109] Ambroz 1973: 97; 1992: 37–38.
[110] Gavrilova 1965: table XVI.1; Vainshtein 1966: table XI; 1972: fig. 13; Khudyakov 2005: fig. IX.5–10.
[111] Vasilieva 2012: 176.
[112] I am grateful to State Hermitage Museum curator Ekaterina Vasilieva for the opportunity of examining this very important find.
[113] Kožomberdieva, Kožomberdiev and Kožomjako 1998: figs 7.2, 8.5; Zasetskaya *et al.* 2007: 72, fig. 25.4.
[114] Kožomberdieva, Kožomberdiev and Kožomjako 1998: figs 7.2, 8.5; Zasetskaya *et al.* 2007: 80, fig. 28.3–9.
[115] Ambroz 1992: 36–37; Herrmann 1989: 669–70, pls XVI–XIX.

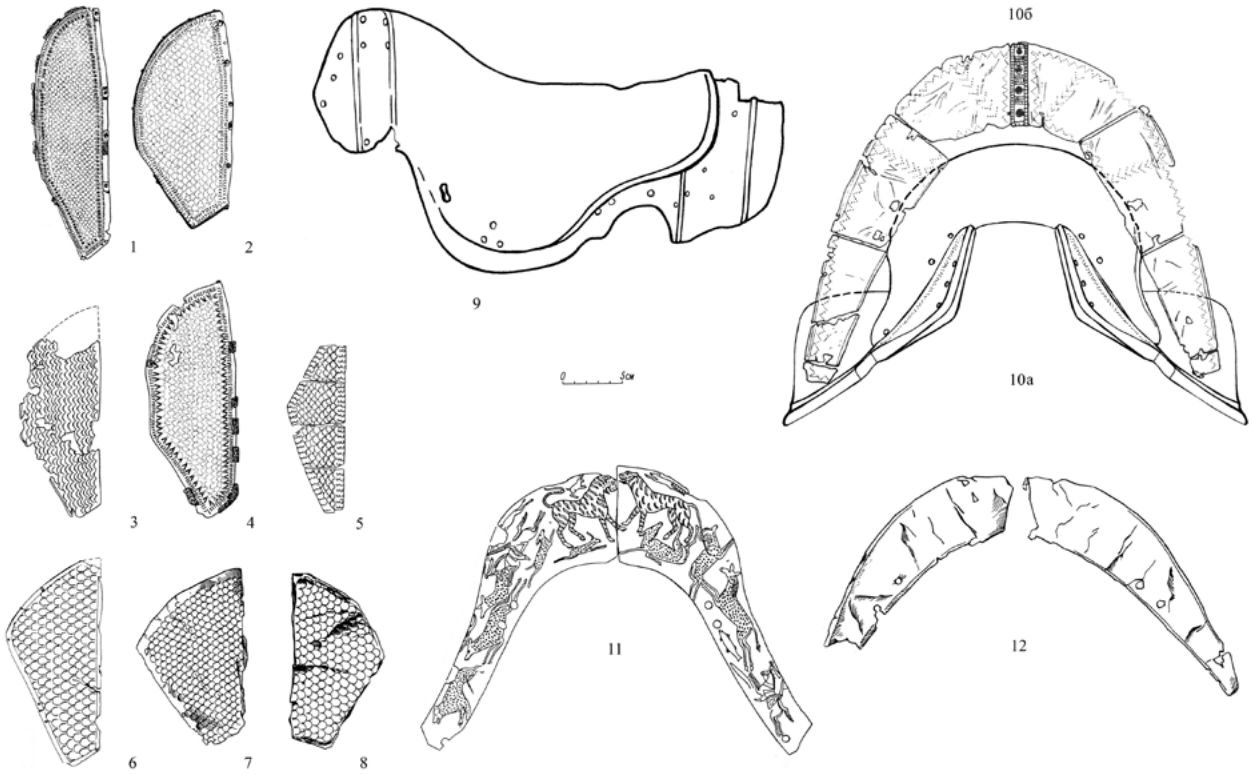

Figure 15. Comparison of the details of Hun (1–8, 1b6, 12) and ancient Turkic saddles (9, 10a, 11): the overlays for the front part of the saddles from Dyurso (1–4), Vladimirskij, barrow 4 (5), Melitopol (6) and Novogrigorievka, burial IX и VIII (7–8); the bar (side view) and the saddletree (front view) of the ancient Turkic saddle from Kenkol, barrow 8, secondary burial (9, 10a); the overlays for the front bow from Melitopol (10b), Kudyrge, burial 9 (11) and Novogrigorievka, burial IX (12); (1, 3–8, 10b, 12, gold; 2, silver; 9, 10a, wood; 11, bone); (1–4, Dmitriev 1979: fig. 4, 1–4; 5–8, 10b, 12, Zasetskaya 1994: tab. 2, 7, 10; tab.4, 15; tab. 7, 3, 9; tab. 35, 13; 7–8, the author's drawings; 9–11, Gavrilova 1965)

The wooden comb of the 'golden lady': a new battle image from the Taksai-1 kurgan (western Kazakhstan)

Lâtife Summerer,[1] Yana Lukpanova[2]

Abstract

In 2012, an undisturbed grave was discovered in the Taksai-1 kurgan cemetery in western Kazakhstan. It belonged to a woman who is popularly referred to as *altun hanum* ('golden lady') and believed to have been of elite status because of the rich gold grave goods she was buried with. The tomb is dated to the late 6th or early 5th century BC by radiocarbon dates on wood and bone. Among the Achaemenid-inspired grave goods, gold jewellery, vessels of glass and stone, a wooden comb with carved figurative decoration is the most outstanding piece on account of its narrative battle scene and war chariot. This paper provides a full description and discussion of the iconography of this contest which shows victorious Persians and the vanquished enemy and compares it with that on a painted tomb chamber near Tatarlı in Phrygia. Finally, it contextualises this battle scene by comparing with representations of similar compositions in Achaemenid art and discussing their historical context.

Keywords: Taksai-1; Tatarlı; Kazakhstan; Anatolia; Achaemenid glyptic; chariotry

The Taksai tomb

The site of Taksai is located near the village Dolinnoe in the Terekti district of the southern Urals, some 50 km east of the city of Uralsk and close to the present border between Kazakhstan and Russia (Figure 1).[3] Dolinnoe has been known archaeologically since the 1960s because of finds from a nearby plundered kurgan, most famous of which is a fragmentary silver *rhyton* in Achaemenid style.[4] In 2011/12, the Centre of History and Archaeology, under the direction of Murad Sdykov and Yana Lukpanova, carried out an extensive survey of this region and systematically recorded and mapped all the visible mounds. During this survey, a kurgan necropolis with a cluster of six mounds called Taksai-1 was found east of Dolinnoe. The integrity of some of these was under continuous threat from annual ploughing,[5] hence rescue excavations of the most endangered burial mounds (kurgans 3, 4 and 6) were carried out in 2012.[6]

Kurgan 6 provided the most interesting finds. Its preserved diameter is 25–45 m although it was only a metre high. The mound contained three burials (Figure 2). The main grave situated in the centre of the mound belonged to an elite woman buried with gold objects (Figures 3–4). Two much similar graves were excavated in the northwest and southeast parts of the mound and found to contain the skeletons of two young women, most probably sacrificed during the burial ritual associated with the principal member and, since their crania were absent, their bodies were interpreted as having been beheaded (Figure 2).[7]

The burial pit contained a roughly rectangular tomb chamber measuring 5.70 x 5.40 m, originally roofed with poplar logs supported by a wooden post in the centre.[8] As there was no *dromos*, the tomb chamber could not have been accessible after the burial ceremony: this is a grave design frequently encountered in kurgan cemeteries of the southern Ural piedmont.[9] The tomb was partly destroyed by a fire set during the funeral,[10] and metalwares placed along the foot of the walls had melted as a result of the high temperatures.[11] Looters had tried to penetrate the tomb chamber in the past but were unsuccessful and the contents survived intact over the intervening centuries.

[1] Arkin University for Art and Design, Kyrenia, North Cyprus; email: latife.summerer@arucad.edu.tr. We are deeply indebted to Christopher Tuplin for commenting on a first draft of the paper but all mistakes remain that of the authors.
[2] West Kazakhstan Museum of History and Local Lore, Kazakhstan; email: yana_2004_75@mail.ru
[3] Sdykov and Lukpanova 2013: 88–97. Taksai is mistakenly located on the map of the exhibition catalogue *Scythians: warriors of ancient Siberia* (Simpson and Pankova eds 2017: fig. 159).
[4] Bonartz and Treister 2013: 715–16; Treister 2013*f*: 78–83, colour pls 2–3; Sdykov and Lukpanova 2013: 88–98.
[5] Sdykov and Lukpanova 2013: 7.
[6] Sdykov and Lukpanova 2013: 101, fig. 1.
[7] Lukpanova 2014*a*.
[8] The determination of the species of wood is based on the analyses carried out by M.I. Kolosova (State Hermitage Museum).
[9] Treister and Yablonsky eds 2013.
[10] Traces of fire are often attested in Scythian kurgan tombs: Crescioli 2017; on ritual feasts during burials see also Simpson and Stepanova 2017: 160.
[11] Sdykov and Lukpanova 2013*b*: 129; according to chemical analysis the burnt earth contained a high percentage of a ferriferous component.

Figure 1. Map showing the location of Taksai and the boundaries of the Achaemenid empire in 6th/5th century BC (adapted from Simpson and Pankova eds 2017: 159)

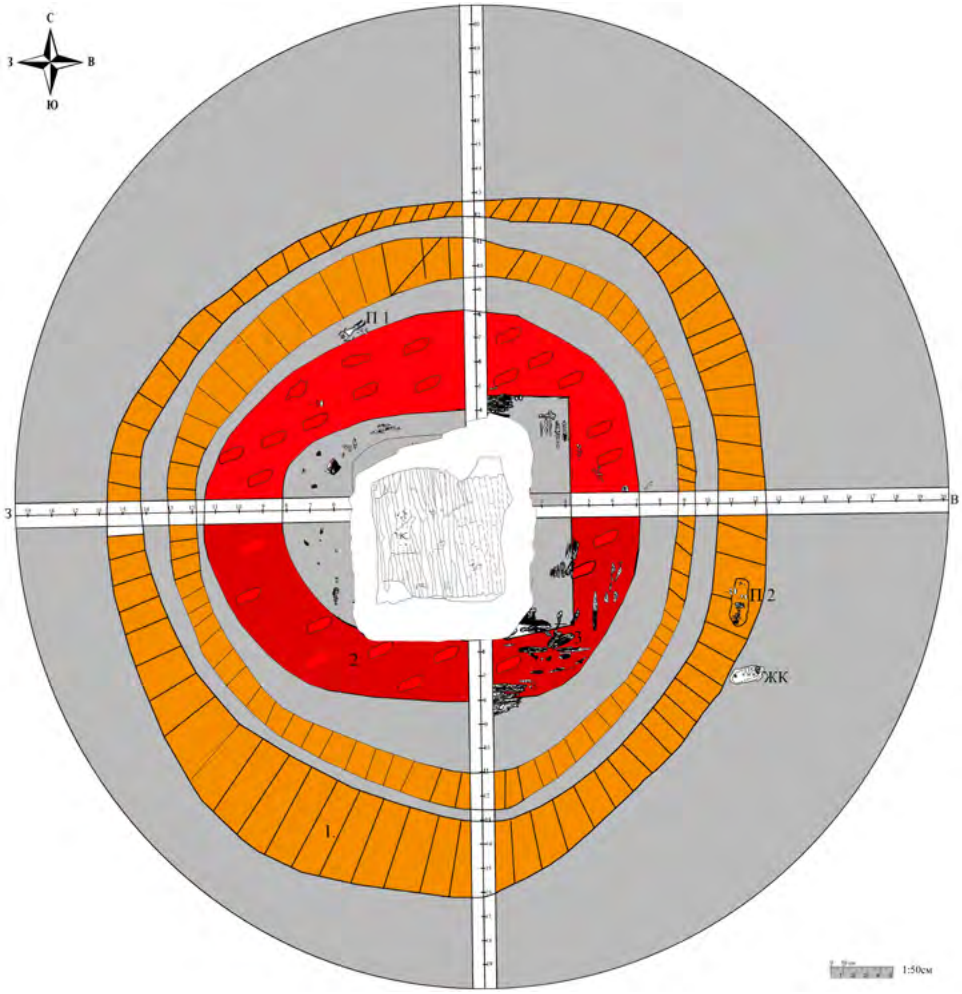

Figure 2. Plan of the Taksai-1 burial with the central tomb chamber and the secondary burials of the beheaded females, П1 and П2 (drawing: Yana Lukpanova)

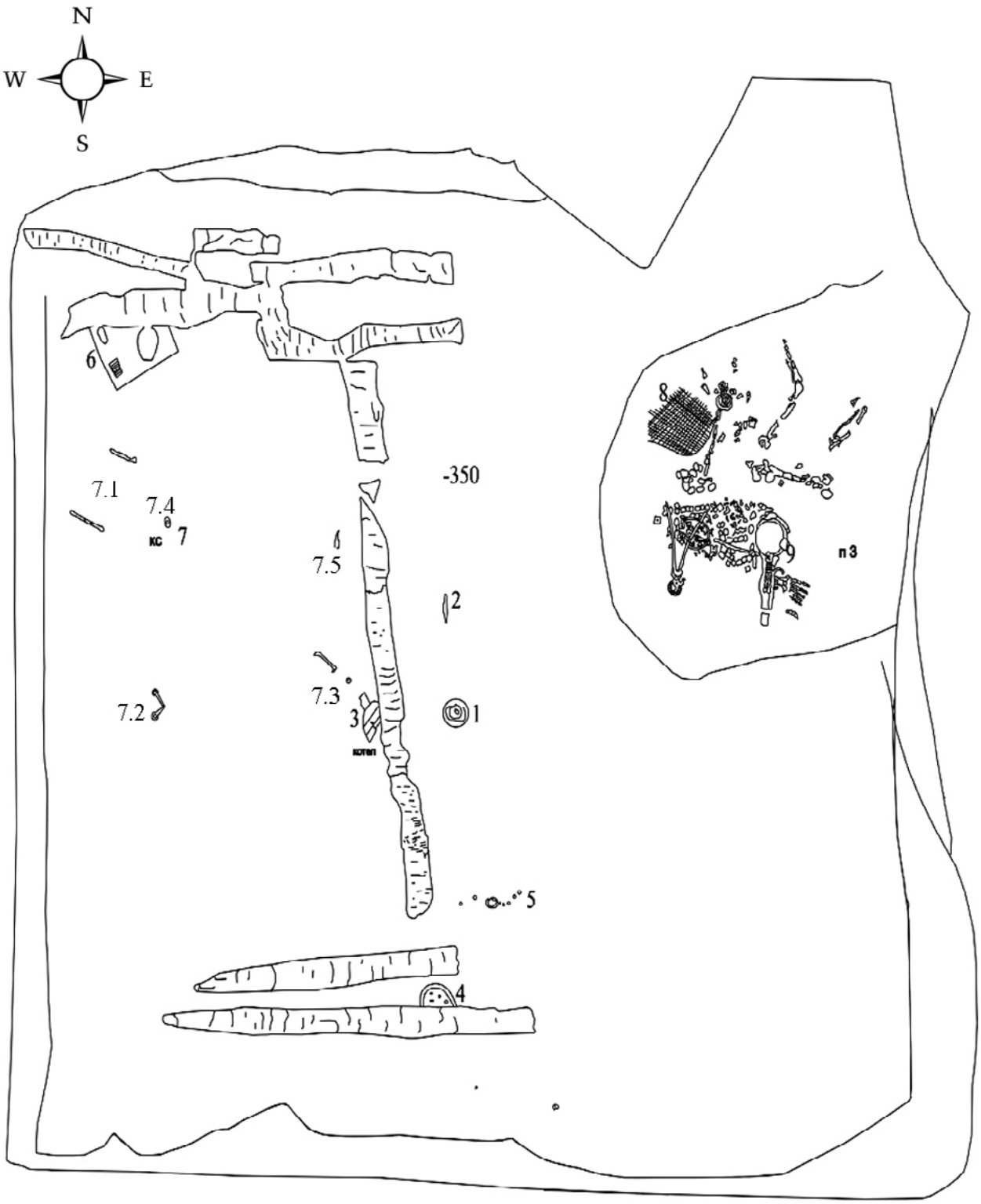

Figure 3. Plan of the burial showing the burial of the 'golden lady', П 3, and the position of the box with the wooden comb, marked as 6 (drawing: Yana Lukpanova)

The body of the principal individual was laid on a mat with her head orientated to the west and located close to the eastern wall. The skeleton itself was burnt and poorly preserved but was determined to be that of a woman, although her age at death could not be confirmed. Personal ornaments found around her body showed that she had been richly adorned during her funeral (Figures 4–5). These finds indicate that she was wearing a dress decorated with gold plaques with relief imagery showing four different 'Animal Style' motifs: a ram, griffin, griffin-ram and swastika (Figure 6).[12] Her tall tapered headdress

[12] Similar dress ornaments from the Prokhorovka and Filippovka kurgans are assigned to the Achaemenid sphere: Treister 2013*b*: 182.

Figure 4. *In situ* photograph of the burial of the 'golden lady'
(photograph: Yana Lukpanova)

was decorated with gold pendants topped by an ibex head with a pair of splendid long earrings with pellet-shaped granulated pendants suspended from chains (Figure 5).[13] These earrings resemble items found in the main graves of Lebedevka-II and Kyryk Oba-II which, according to Mikhail Treister, were imported from Achaemenid Anatolia.[14] A pair of gold bangles with animal-head finials, again of Achaemenid origin, adorned her right wrist.[15] Around her neck she wore a gold hollow spiral torc.[16] Several gold biconical beads might have belonged to a necklace.[17] A hazelwood box containing a bronze double-sided mirror with a gilded and animal-head decorated handle was found beneath her right hand,[18] while her left held a small (also imported) core-formed blue glass vessel decorated with yellow and white zigzag trails which may once have contained cosmetic.[19] Five wolves' teeth, each held within a granulated gold setting, were found close to the woman's hand – a phenomenon also known from the Petrovka kurgan – and may have been intended for apotropaic or talismanic purposes.[20]

Some vessels and other items had been placed in the centre of the chamber: they included a bronze cauldron with a bell-shaped foot, two loop handles and a camel-head-shaped spout, an iron knife, a bronze vessel pierced with a small hole which may have been used as a strainer or brazier, and a wooden bowl decorated with gold appliqués. These presumably had been intended for use together in some form of ritual.[21] Four sets of horse bridles were found by the western wall of the grave;[22] although no equid bones were encountered inside the tomb chamber, the remains of several horse skeletons, as well as the bones of cattle and sheep, appeared in the

[13] Sdykov and Lukpanova 2013: 192–201; Simpson and Pankova eds 2007: 137, cat. 67. Jewellery of similar design and technique is attested in the Lebedevka-II kurgan: Treister 2013*b*: 167, col. pl. 10.1-2.

[14] Treister 2013*b*: 167–68.

[15] Sdykov and Lukpanova 2013: 182–92; cf. Simpson and Pankova eds 2007: 303, cat. 218; different conclusions as to how they were made are reached in independent analyses reported by Satubaldin *et al.* and Shablavina, this volume; for parallels see Treister 2013*b*: 172.

[16] Another massive torc of gilt silver with rhomboid decoration found in a looted kurgan near the village Dolinnoe was, according to Treister, produced in Achaemenid Anatolia, possibly in Lydia: Treister 2013*b*: 161–62. A simple hollow torc like that from Taksai-1, but with animal finials, is known from the Filippovka-I kurgan: Treister 2013*b*: 161, col. pl. II 22. 1.

[17] Treister 2013*b*: 176–78.

[18] Sdykov and Lukpanova 2013: 237–39. Similar mirrors are attested in the Lebedevka, Kyryk Oba and Buldurty kurgans: Treister 2013*d*: 143–57.

[19] Sdykov and Lukpanova 2013: 232–34; an identical glass bottle was also found in the Krasnoural'skij kurgan 1, grave 4 which is determined to be an Achaemenid import because of its technique of manufacture: Treister 2013*c*: 472, colour pl. 7.

[20] Sdykov and Lukpanova 2013: 244–45; gold jewellery with wolf's teeth was also encountered in the Petrovka kurgan: Treister and Yablonsky eds 2013: 478, col. pl. 13.

[21] Sdykov and Lukpanova 2013: 137–39, fig. 11.

[22] Five horse bridles consisting bridle bits, psalia and distributors were found by the western wall and at the southwest corner of the tomb: Sdykov and Lukpanova 2013: 125.

Figure 5. Detail of the burial with burnt human remains and gold jewellery (photograph: Yana Lukpanova)

Figure 6. Reconstruction of the 'golden lady' (photograph: Krym Altynbekov)

earth fill of the kurgan and may represent the remains of sacrificial rituals.[23]

An item found in the northwest corner of the grave deserves special attention. This is a hazelwood box (Figure 7) which originally contained a wolf's paw, wolf fangs, a small alabaster bottle, a mortar and sandstone pestle, some pebbles, a bone-handled knife and, last but not least, the comb with carved figurative decoration which is the focus of this paper. The excavators suggested that these items were put together in the box for ritual purposes.[24]

The comb

The comb – like the other items – was heavily damaged by fire and had partly disintegrated (Figure 8). However, thanks to careful *in situ* documentation by the excavation team and the commitment of Krym Altynbekov,[25] it has been almost completely reconstructed (Figure 9). The comb was made of poplar-

[23] Sdykov and Lukpanova 2013: 102–109, 122, 129.
[24] Sdykov and Lukpanova 2013: 141.
[25] However, as will be shown below, the fragmentary condition of the wood meant that the figures of the frieze could not be perceived in all details and the drawing has some errors. A replica of the comb was executed by Kyrm Alynbekov and loaned by the National Museum of Kazakhstan to the exhibition *Scythians: warriors of ancient Siberia* as the original was too fragile to be sent (Simpson and Pankova eds 2017: 300, cat. 214).

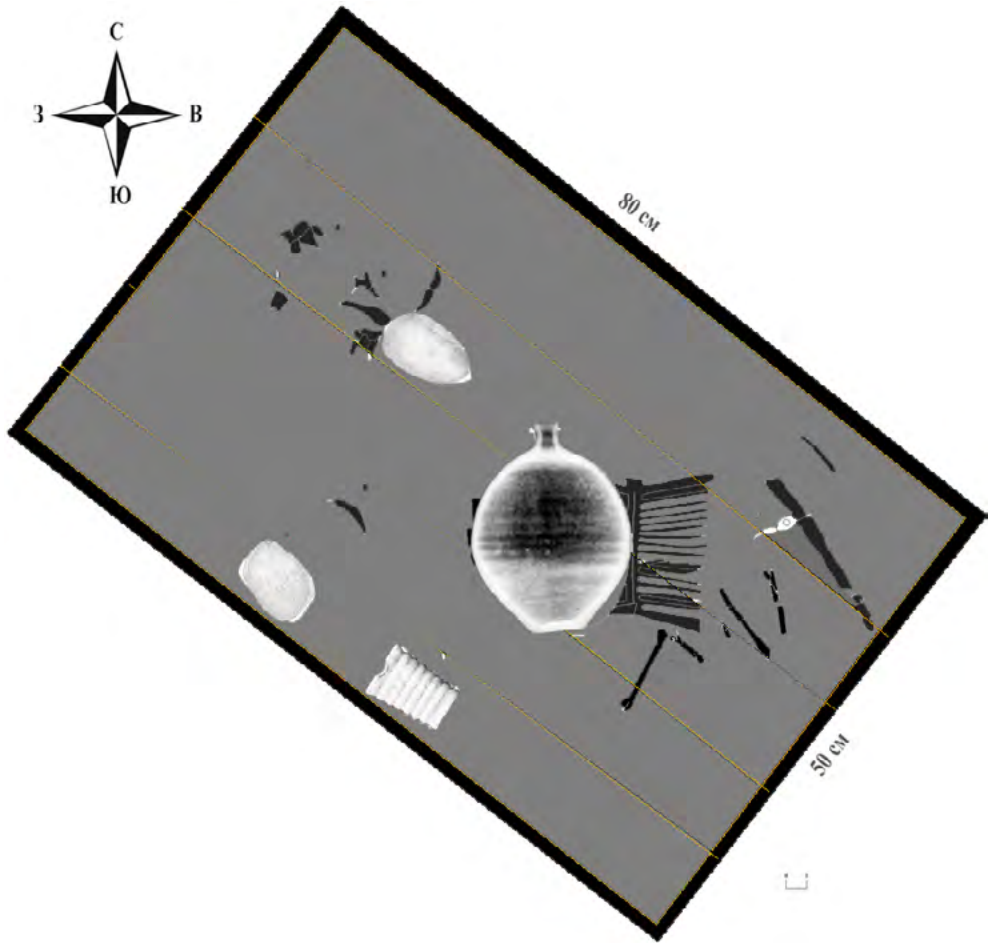

Figure 7. Findspot of the wooden comb within the hazelwood box (drawing: Yana Lukpanova)

wood, like the roof of the tomb chamber. It measures 5.8 cm high and 6 cm wide. It is double-sided, the teeth on one side being short and fine while those on the opposite side are wide and coarse. The central part of the comb carries a carved figural composition visible on both sides (Figure 10). The edge of the composition is decorated with alternating light and dark wooden inlays. The figures are carved in openwork technique (à jour), i.e. they do not attach to a solid background as is usual for a relief, but are carved from both sides as if they were free-standing sculptures. However, as the wood is only 0.7 cm thick, the figures have no volume and appear two-dimensional. Openwork is a carving technique well attested in Eurasia as well as in Egypt and Iran.[26]

Description of the scene

The composition consists of a chariot and three human figures.[27] The chariot approaches from the left and is shown drawn by a pair of horses. It has a pair of six-spoked wheels, studded with hobnails indicated by their serrated profiles. The edge of the chariot box is curved at the top and decorated with a zigzag motif. The dots within the triangular elements imitate nail heads to convey the wooden construction of the wagon. Behind and partly over the wheel is a large diagonally incised and dotted oval feature which represents a quiver, typical of war chariots.[28] The horses are ram-headed with short cropped manes and their long tails are knotted according to Iranian custom. The harnessing of the horses is shown by a strap led around the neck and chest. The decoration of the straps is differentiated, probably in order to indicate their different fabric: the neck strap has vertical lines while the breast strap is decorated with circular chain-like elements. The straps are connected above the withers of the horses by a relatively large ring representing the rein guide or terret. Two lines rising in a slightly diagonal direction from the muzzles of the horses and held by both by the charioteer and the enemy look as though they should be reins, but do not end, as one would expect, in the hands of the driver, but seem to be attached to the front screen of the box. Neither the draught pole nor axle are visible. The function of the upside-down U-shaped object behind the neck of the

[26] Stucky 1985: 16.

[27] The published drawing and comb replica mistakenly show only three figures: Sdykov and Lukpanova 2013: 223; Lukpanova 2014*a*: fig. 27.

[28] Summerer 2007: 13, fig. 13.

Figure 8. *In situ* photograph of the wooden comb (photograph: Yana Lukpanova)

horses is unclear but may represent a misunderstood functional part of the chariot such as the draught pole.

The chariot crew consists of two individuals. The charioteer is leaning over the front of the box and holds the reins. His head was found broken and separated from the body having slipped a few centimetres to the right. He is the tallest person and therefore must have been considered the most important figure in the scene: what appears to be a long pointed chin instead indicates a beard although the individual hairs are not rendered. His hair is straight and cut at ear length with a curving lower edge; it is similar in cut to the hair of the archer behind. He wears a low cylindrical piece of headgear, probably a crown (Figure 11). His dress consists of two pieces, an undergarment with sleeves and a cloak hanging from his shoulder. The zigzag pattern decorating the edge of the cloak may imitate a fur trim.[29] This is surely the type of Median cloak with empty sleeves known as a *kandys*. The clean-shaven archer stands behind the charioteer and aims his bow at an enemy in front of the chariot. He is clad in a sleeved close-fitting costume which is visible from his slim waist upwards. The upper part of his head is not preserved and the shape of his hat is hardly recognisable.

The enemy approaching on foot from the right appears to brace himself against the heads of the horses. The back of his lower body is not shown, probably because of constraint of space und difficulty the artist had in carving these details in openwork technique. He wears a long coat which is cut away and rounded along the lower front edge; a double outline running from the neck downwards probably indicate a fur trim. His loose trousers are tied at the ankles and probably tucked in his boots. His hat covers his entire head and is tied beneath the chin. Despite damage to the upper part its characteristic shape is recognisable, as its articulation by a peak slightly raised over the forehead. This individual is armed only with a large quiver hanging horizontally from his belt and down his leg. This is a case for a double-curved Scythian bow and quiver of the sort known as a *gorytos.* It has a recessed frame while the main part is decorated with a dotted lozenge design.[30] The belt is shown with dotted oval sections resembling a chain-like girdle. Although the target of attack this person makes no use of his weapon for self-defence but instead attempts to defend himself by grasping the reins of the horses with his left hand in order to arrest the chariot. His right hand is disproportionately large and is raised with the thumb turned to the right in what looks like a vain assault on the approaching vehicle.

Interpretation

The battle scene on this comb displays clear iconographic resemblances with Achaemenid

[29] Sdykov and Lukpanova 2013: 222 interpreted this as the decoration of the upper part of the sleeve.

[30] This type of *gorytos* was recently discovered at Arzhan-2 in Tuva and reconstructed: see Chugunov, Ryabkova and Simpson 2017: 196, figs 122–23.

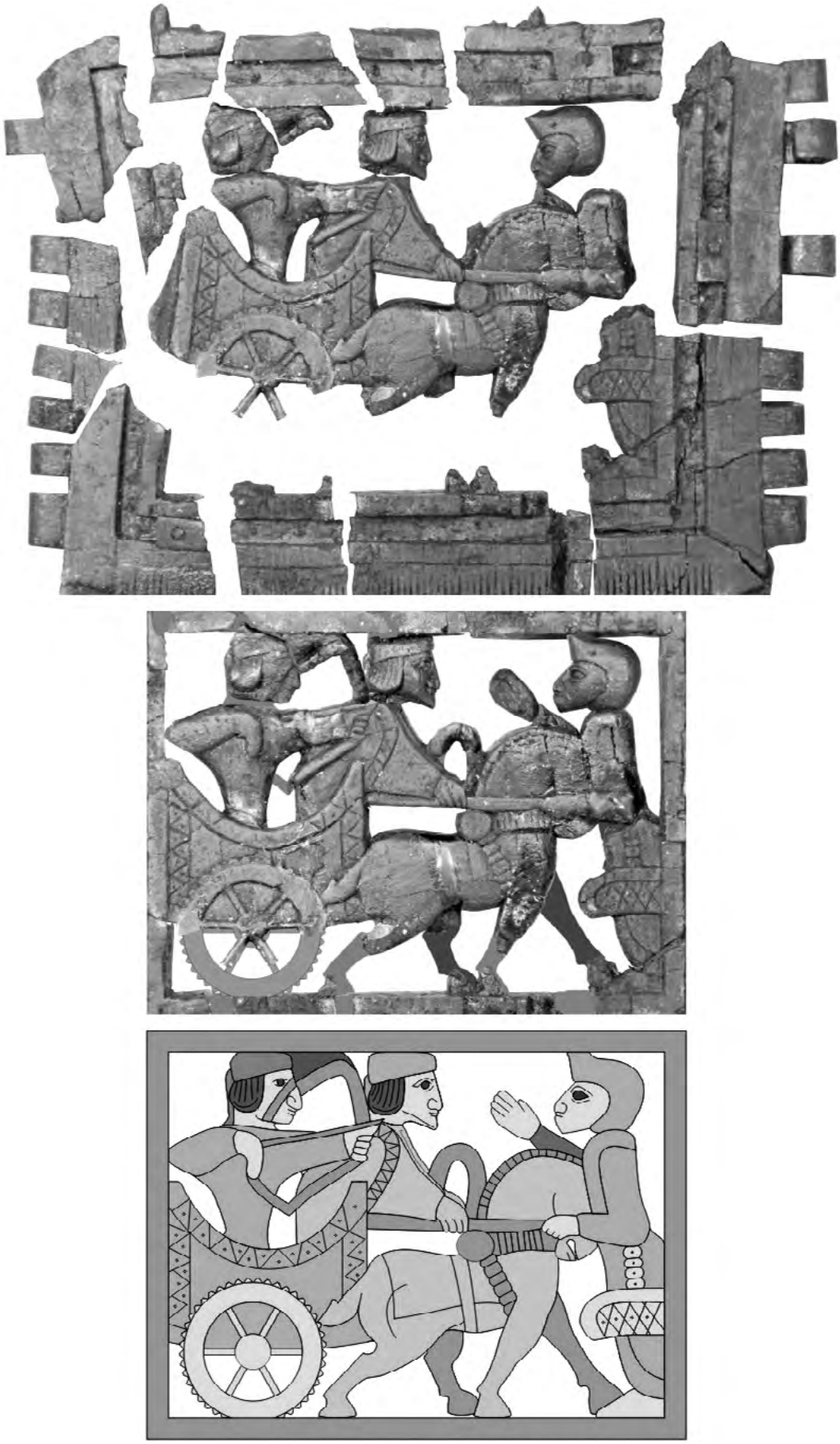

Figure 9. Reconstruction of the wooden comb (reconstruction and drawing: Krym Altynbekov)

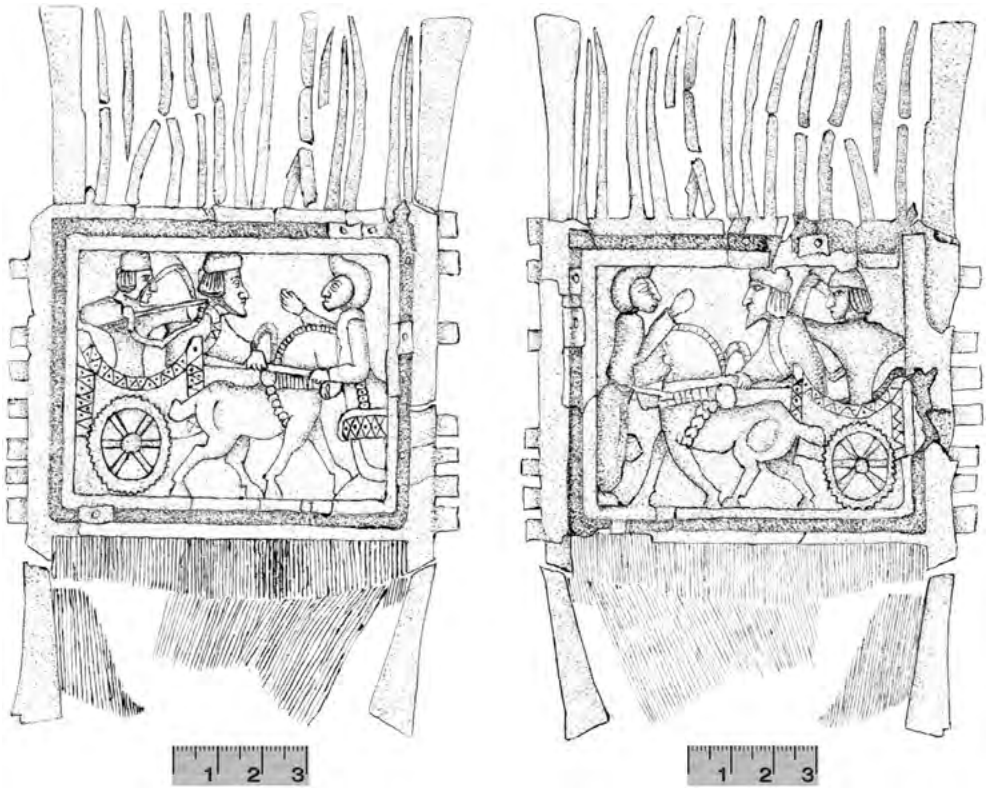

Figure 10. Drawing of the wooden comb (drawing: Timur Diyarov)

warfare imagery depicted across different media: based on these we can easily identify the party approaching from the left as representative of the victorious Persian army which is shown as superior in terms of headcount and formation, i.e. chariotry and archery.[31]

The driver is picked out as the most important figure in this scene through his larger size and he seems to represent the chariotry and commander of the Persian army.[32] His low cylindrical headgear with a horizontal band is best interpreted as a dentate crown which was worn by royal heroes and Persian nobility.[33] He wears a *kandys,* an empty-sleeved Median overcoat hung from the shoulders, which was typically worn by priests, hunters and Persian nobility,[34] but hardly suited for a warrior in combat.[35] The forward leaning posture of his upper body suggests speed of movement fitting the dynamic of battle but contradicted by the leisurely walking gait of the horses: in hunting and combat scenes horses are usually shown in extended gallop, whereas pacing horses appear in peaceful processions.[36] This odd combination on the Taksai comb suggests that its designer was not that familiar with Achaemenid iconographic conventions, as is explored further below.

The enemy coming from the right is represented by a single footman, a fact which symbolises his inferiority. His only weapon is the bow case which is not used, probably because of an unexpected sudden attack. The right hand raised toward the approaching Persians is less a futile bare-handed attack than a last desperate gesture of supplication. The defeated figure is clearly distinguished by his attire and weapon from the victorious Persians. The combination of attire of cut-away coat, trousers and pointed hat allow us to assign him to a nomadic tribe residing in Eurasia or central Asia.[37] Among the tribute bearers represented on the Apadana reliefs at Persepolis one group is shown in similar attire, namely Delegation XVII.[38] In addition to their *gorytos*, they carry shaft-hole picks. The ethnic and geographic origin of Delegation XVII has not been

[31] On the artistic convention that 'the victorious party comes from the left' see Luschey 2002.

[32] In hunting scenes, it is not the charioteer but the archer who represents the Persian hero or the Persian king: see for example the famous 'Darius seal' scene (Merrillees 2005: 52–53, cat. 16, pl. VII = British Museum, inv. nr. 89132).

[33] Summerer 2007: 12, n. 59 with references.

[34] On the Oxus Treasure chariot the *kandys* bearer is not driving the chariot (Dalton 1964: 3–4, cat. 7, pl. IV, Mongiatti, Meeks and Simpson 2010 = British Museum inv. nr. 123908); chariots shown on the northern and eastern facades of the Apadana are driven by a charioteer wearing 'court dress' and a twisted fillet on his head (Curtis 1998).

[35] Thompson 1965.

[36] The combat scene of the Tatarlı tomb is an exception to this rule as the war chariot drawn by pacing horses (Summerer 2010: 131, fig. 9) and on two bullae from Dascyleium the horses are shown in walking instead of galloping posture (Kaptan 2002: 198, figs 199–201). Chariot horses in hunting scenes are always shown in extended gallop: Siamak 2018; Tuplin 2020: 365.

[37] On the problem identification of the Scythian costume: Gleba 2008: 13–28.

[38] Schmidt 1953: pl. 43; Walser 1966: pl. 24; Potts 2012: fig. 5.

Figure 11. Heads of the figures of the battle scene
(photographs and drawing: Krym Altynbekov and Oleg Belyalov)

decisively pinpointed by modern scholarship.[39] On the tomb reliefs of Naqsh-e Rustam, where the throne-bearers representing the subject peoples are labelled with inscriptions, figures with identical attire appear for three different ethnic groups: Sogdians, Chorasmians and *Saka haumavargā*.[40] Moreover, the Sogdian depicted on the base of the Egyptian statue of Darius found at Susa wears a hat which, although its flaps are not tied beneath the chin, has a peak rising slightly above the forehead in a manner which closely correlates with the headdress of the defeated warrior on the Taksai comb.[41] On this basis Wu Xin concludes that the position of the frontal hat peak was crucial for characterising Sogdians, who are otherwise undistinguishable from Chorasmians and other Saka tribes.[42] Nevertheless, the identification of Delegation XVII as Sogdians is controversial and should be treated cautiously.[43] In short, it is difficult to know whether figures characterised by a frontally pointed hat like that worn by the defeated figure on the Taksai comb represent an ethnically and geographically specific group or simply indicate generic Eurasians or central Asians.

In either case, based on these comparisons, we can be quite sure that the depiction on the Taksai comb narrates a military clash between Persians and a Eurasian or central Asian tribe, whether Sogdians, Chorasmians or *Saka haumavargā*, from which the Persians emerged victorious. None of these people are geographically associated with the southern Ural piedmont where the Taksai comb was found. Sogdiana is located in modern Tajikistan and Uzbekistan, and was conquered by Cyrus II the Great.[44] Situated on the banks of Oxus, to the south of the Aral Sea, Chorasmia was incorporated into the Achaemenid Empire before 522 BC. *Saka haumavargā* ('*haoma*-drinking Sakas') are often mentioned together with the *Saka tigraxauda* ('pointed cap Sakas') in written sources, and considered to be the easternmost Saka tribe as they were said to occupy the region between the Caspian and the Aral Sea,[45] well to the south of those nomads occupying the southern Ural piedmont.

Style

The Taksai comb follows a style known from Achaemenid glyptic. The figures are carved with deep flat outlines and only partially modelled. The inner structure of the hair of the figures, their facial features and dress decoration are defined by lines but the beard of the main Persian protagonist is indicated simply as a long and pointed chin, lacking detail. The garments are generally rendered flat without folds, but in some parts are quite detailed. The large almond-shaped eyes are executed with thick eyelids, whereas the pupils are not specified (Figure 11). The horses are more carefully modelled than the human figures, especially the rumps, hindquarters and legs which display a fully plastic appearance. Their muzzles are finely carved but the eye is omitted and the short-cut mane is shown with rough strokes.

Following the principles of isocephaly, whereby the heads of the figures in a composition are brought to the same level, the heads of all human figures, whether mounted or standing, are rendered at the same height. The vertical lines of the composition are accentuated by the human figures in an upright position, whereas the chariot and horses, as well as the reins and outstretched arms, form a horizontal line. The figures are arranged adjacent to each other and distributed evenly in the space. The empty space in the middle of the upper zone is minimalised by the forward-leaning charioteer and the raised hand of his opponent. There are only a few overlaps which illustrate depth. The string of the bow overlaps the face of the archer and the head of the charioteer in the background. The two horses are not distinguished by their legs or heads, but indicated by rendering their hindquarters overlapping the chariot-box on both sides. The chariot, horses, charioteer and enemy are rendered in full profile, but the archer's triangular body shows frontal shoulders. All figures have bird-like frontal eyes. Bodily proportions seem to be sculptured carelessly: the bent arm of the opponent is too long and his raised right hand is disproportionately large. Although the figures are carved from both sides, there is no foreshortening to indicate distance and depth.

The carved battle image of the Taksai comb displays stylistic features known from Persepolitan glyptic imagery.[46] The inconsistencies in adapting standardised Achaemenid iconography and style, described above, and the similarities to the composition of the Tatarlı wood painting in Phrygia connect the comb with Anatolian production (Figures 12–14),[47] yet the use of poplar wood suggests local manufacture.

Contextualising the Taksai comb

Depiction of a violent military conflict on a female-related item is surprising and rare on luxury artefacts

[39] For discussion in the previous literature see Potts 2012: 466–67 who argues that Delegation XXII originated somewhere in the east in Siberia.
[40] Schmidt 1957: 29; on this problem Wu 2005; 2010; 2014; Tuplin 2020: 374, 401.
[41] Roaf 1974: 94–145; cf. Wu 2005: 67, fig. 10.
[42] Wu 2005: 74.
[43] Tuplin (2020: 373-74) criticises the general tendency in Wu's interpretation to favour the Sogdians.
[44] According to Wu (2005: 398–90), Sogdiana was only occasionally subjected to the Achaemenid empire.
[45] Narain 1987.
[46] Garrison and Root 2001; Garrison 2011.
[47] Summerer 2007; Summerer and von Kienlin eds 2010.

Figure 12. Replica of the battle scene from the Tatarlı tomb (photograph: Hakan Kibar)

in general. The gold comb from the Solokha kurgan, dated to the first half of the 4th century BC, seems to be the only example directly analogous to this comb from Taksai-1.[48] The gold necklace exhibited in the Miho museum is the only example of jewellery decorated with a scene of 'Persians versus Eurasian enemy'.[49] On public monumental art of the Achaemenids battle scenes are absent. The Bisitun rock-cut relief with its multilingual inscription is the only historical monument which records military campaigns, including one against the *Saka tigraxauda*,[50] yet it does not depict the battles themselves, only the triumph in the aftermath with the king surveying a row of captives.

Warfare imagery involving Persians and their enemies is mostly found in Achaemenid glyptic. Thanks to recent research, seal images with combat scenes have been systematically documented and analysed, and Christopher Tuplin provides a full catalogue of all glyptic images from the Achaemenid period which illustrate military activity.[51] Wu Xin focuses on those which show combat scenes between Persians and Eurasians/central Asians.[52] Unfortunately, most of the seals depicting military conflicts in museums and private collections lack provenance, but excavated seals and sealings bearing such images have been found at Persepolis in the Fortification and Treasury Archives (509–493 BC and 492–460 BC respectively),[53] and also in modest numbers in satrapal centres in Anatolia, Mesopotamia and Egypt.[54] In most cases the ethnic origin of the enemies is identifiable by their specific attire and weaponry when compared with the Achaemenid royal tomb reliefs at Naqsh-e Rustam where the representatives of the subjected ethnic people are helpfully labelled with cuneiform inscriptions: they are often Greeks, occasionally Eurasians/central Asians and only rarely Egyptians.

From the group of Eurasians/central Asians only the tribe of 'pointed hat Scythians' (*Saka tigraxaudā*) is precisely identifiable by their tall backward-slanting pointed hats. As noted above, the hat with a slight frontal peak as indicated on the Taksai tomb is difficult

[48] Alekseev 2003*b*.
[49] Bernard and Inegaki 2000: 1371–1437.
[50] Wu 2005: 48–51 with fig. 1; according to Wu (2010: 548) only a representation of the aftermath of war was acceptable in official imperial art; see also Wu 2014.
[51] Tuplin 2020.
[52] Wu argues that these images have a specific historical significance, both within the frame of her dissertation (Wu 2005) and in two separate papers (Wu 2010; 2014).
[53] Only a dozen seals show human combat scenes (Garrison 2000: 10–151; 2011: 100). They are proportionately much rarer in the Fortification archive.
[54] In Tuplin's catalogue (Tuplin 2020) 65 glyptic battle images are listed, under a third of which involve enemies from Eurasia/central Asia. Wu (2010: 249) has observed that battle images with a central Asian/Eurasian enemy are mostly preserved on bullae excavated in Dascyleium and assigns the pieces found elsewhere also to Anatolia on the base of their 'Greco-Persian' style (Wu 2014: 248).

Figure 13. Detail of the replica of the battle scene from the Tatarlı tomb (photograph: Hakan Kibar)

Figure 14. Original painting with the chariot of the battle scene from the Tatarlı tomb (photograph: Roy Hessing)

to assign to a particular ethnic group since this headgear is typically worn by Sogdians and Chorasmians, as well as other Saka groups. Persian enemies classified as Eurasians or central Asians all wear tight body-hugging coats with cut-away fronts, loose pants tucked into boots, and frontally raised hats with earflaps fastened under the chin, as does the figure on the Taksai comb.

In terms of iconography and style, the varying compositions of combat scenes on seals originate in the late Assyrian artistic tradition.[55] They mainly show two types of military clash: hand-to-hand combats between foot soldiers and a Persian horseman confronting an opponent on foot. The first depicts a Persian commander or 'royal hero' stabbing his enemy in the chest with his dagger/sword or spear, a composition developed from the popular image of a heroic encounter between a hero and a mythological creature. The second but less frequently used type shows the victorious Persian attacking the enemy from horseback with a spear.[56] The latter is shown vanquished, either fleeing or with hands raised in a gesture of supplication similar to that on the Taksai comb. Interestingly, among the numerous glyptic images, no battle scene involving a chariot has so far been found on a seal certainly belonging to the Achaemenid period.[57] Chariots do appear in procession

[55] Garrison 2011: 399–405.

[56] From a list of 108 glyptic which actually or potentially relate to land warfare, 68 involve foot soldiers and 40 involve horsemen (Tuplin 2010: 114). This list represents a larger category of material than that catalogued in Tuplin (2020) as it includes military figures who are not shown engaged in actual combat with human adversaries. The precise figures quoted in Tuplin (2010) are now somewhat out of date, but the proportion between types is still broadly valid.

[57] Tuplin 2010: 115, n. 48. The only example for a battle image involving a chariot is a late 4th century scaraboid stamp seal in the

scenes on stone sculpture at Persepolis and in hunting scenes on the glyptic. A warfare image symbolising the military power of the victorious Persian army by means of a chariot, as depicted on the Taksai comb, otherwise appears only on a painted wooden beam from the Tatarlı tomb in Phrygia.[58]

The frieze from the eastern wall of this tomb presents a large battle composition with 23 human figures, nine horses and a chariot which represents the victory of the Persian army over the 'pointed hat Scythians' (*Saka tigraxauda*).[59] The clearly distinguished adversary parties are shown moving towards each other. The victorious Persian army proceeding from the left consists of 12 warriors, while the defeated Scythian army is represented by 11, of whom several are injured or already dead. The central composition, showing hand-to-hand combat, involves a Persian protagonist clad in an Achaemenid 'court robe' and crown killing the leader of the Scythians who is unable to make use of the battle-axe hanging from his waist and tries in vain to free himself from the grasping hand of the Persian, while his empty left hand seems to beg for mercy.

Compositional similarities between the battle scenes on the Taksai comb and Tatarlı frieze are obvious but there are also differences, hence the Taksai comb simply cannot be considered as a reduced version of the Tatarlı frieze. The type of Achaemenid chariot represented on both corresponds generally to those shown in procession scenes at Persepolis, as well as hunting scenes shown on Achaemenid glyptic, and in both cases a two-wheeled chariot is pulled by a *biga* of ram-headed horses. The deep box with curved upper rim and the two-man crew are convincingly similar although the wheel at Tatarlı is eight-spoked while the Taksai chariot has only six. Some harnessing elements, such as the neck and breast straps, are similar in both representations. The Tatarlı chariot has a high curved draught pole which is linked with the terret by means of two vertical lines.[60] A draught pole and other technical details of traction are not shown at the Taksai comb. This incomplete rendering can be explained by constraints of space and the inability of the carver to reproduce all the details of his model in wooden form.

On the sculptured eastern and northern facades of the Apadana at Persepolis two-wheeled chariots drawn by two horses appear in the tribute procession of the Syrian delegation.[61] The chariots on the eastern stairway of the Apadana are depicted alongside a group of Medians and Persians with a lone driver slightly bent forwards.[62] The chariot body is richly decorated with striding lions and lattice patterning, as well as a quiver. The general appearance of the chariots from Taksai and Tatarlı matches these sculptured chariot representations. The walking gait of the horses also corresponds, which naturally suits the non-violent procession scene, but not the scene of raging war represented on the Taksai comb and Tatarlı painting and in the latter case the combination of peacefully advancing chariot with galloping cavalry horses is also a paradox.

Since there are no battle scenes in monumental Persian art and as glyptic warfare imagery preferences infantry over cavalry scenes and omits chariots altogether, the question arises as to what model (if any) the carver of the Taksai comb and the painter of the Tatarlı beam were following when they produced their compositions. In her study of the Tatarlı frieze, Lâtife Summerer states that in composition, iconography and style the battle scene is firmly embedded in Achaemenid art.[63] Bruno Jacobs has disagreed with this because of the absence of such battle images in the heartland of the Achaemenid empire and instead favours a derivation from Greek art.[64] However, this claim ignores new discoveries, notably that of a wall-painting at Dahaneh-ye Gholaman in Sistan which has the representation of a hunting scene,[65] as well as other recent academic discussion.[66] The background to the Taksai and Tatarlı images therefore certainly lies in non-Greek art.

The links between the Achaemenid glyptic warfare repertoire and the preceding late Assyrian iconographic tradition have already been noted,[67] and their existence highlights the fact that battle scenes were not only placed on the walls of Assyrian palaces – in contrast to the situation in the Achaemenid world – but also frequently involved and underlined the importance of chariots.[68] However, these chariots, usually with a two- or three-man crew of one or two archers plus a charioteer, are always pulled by

British Museum (Curtis and Tallis eds 2005: 225, cat. 407 = British Museum, inv. no. 1911,0415.1). This image may be inspired by a Hellenistic painting suggested as the model of the Alexander mosaic and is the subject of detailed depiction and discussion (Tuplin 2020: 436-39, cat. 62, fig. 51).

[58] Summerer 2007; 2010: 126–44.

[59] Summerer 2007: 4–30; 2010: 121–44.

[60] Such a draught pole is unattested in other ancient chariot representations but shown at Tatarlı on three more chariots on the convoy frieze on the northern rear wall which is interpreted as showing 'departure to war': Summerer 2010: 142–44.

[61] Schmidt 1953: pl. 32.

[62] Schmidt 1953: pl. 52.

[63] Summerer 2007: 21; 2008: 286.

[64] Jacobs 2014: 348–64, generally rejects any artistic link between the battle scene and Iran and claims that Summerer undervalued the Greek influence on it. Jacobs 2014: 360: 'Dass der griechische Einfluss hier vollig ausgeblendet wird, ist nun gewiss im Sinne jener eingangs beschriebenen Tendenz zu werten, den griechischen Einfluss zu marginalisieren'.

[65] Sajjadi 2007.

[66] Jacobs 2014: 349.

[67] Garrison 2011: 399–405. Such links are nicely encapsulated in the famous seal of Cyrus of Anshan (PFS 93*): this is a 7th century BC heirloom seal which was still in use in the 5th century BC and depicted combat between a horseman and an infantry adversary: Garrison 2011; see also Wu 2010: 551, fig. 51.2; 2014: 220–21.

[68] Dezsö 2012; see also Trimm 2017.

Figure 15. The main gold chariot model from the Oxus Treasure (The British Museum, inv. nr. 123908; reproduced by courtesy of the Trustees of the British Museum)

galloping horses.[69] There is no parallel here for the odd walking gait of the chariot horses on the Taksai comb and Tatarlı painting.

Indeed, the only reasonable explanation for the depiction of the chariot in these two images is that there was no direct model at all. Instead it seems that the carver and the painter adopted the depiction from a different iconographic context in order to create an entirely new chariot-battle image. The chariots, along with their horses and (at Taksai) a charioteer clad in a *kandys* are, in fact, instead taken from a procession scene. In the convoy scenes in the Tatarlı and Karaburun tomb paintings a man wearing *kandys* and *bashlyk* sits alone in the chariot box,[70] although he is not driving the horses since the reins are attached to the front screen of the box. The gold chariot model from the Oxus Treasure, which probably also belonged to the genre of procession scenes, carries a passenger with a *kandys* sitting behind a standing smaller-scale chariot driver (Figure 15).[71] By comparison with these men, the forward-leaning posture of the charioteer on the Taksai comb is striking. His posture and the manner in which he holds the reins resemble the charioteer in the hunting scene shown on the 'Darius seal', also in the British Museum (Figure 16). The archer in the chariot is a type of figure often encountered in hunting scenes.[72] Meanwhile the figure of the enemy conforms in general terms to the vanquished non-Persian warrior of battle images on seals. As noted earlier, his attire identifies him as the Eurasian or central Asian adversary of Persians, and the manner in which his left hand grabs the reins, while his right is raised begging for mercy, also has analogies in the iconography of victims in glyptic battle images.[73]

This comparative analysis leads to the hypothesis that the carver of the Taksai comb, like the Tatarlı painter, created a new chariot-battle composition by combining and re-interpreting figures from existing Achaemenid battle, hunting and procession scenes. This use of multiple iconographic models represents an artistic experiment in the depiction of Persian military power which goes beyond its own imperial iconographic tradition.

The Taksai comb displays an imagery charged with Achaemenid imperial ideology. Its style of carving shows characteristics which differ from the glyptic styles known at Persepolis and fits well with the provincial styles variously labelled as *koine, persianising*[74] or *Satrapienkunst*.[75] Style has been often seen as an indication either of the ethnic origin of artists, the commissioner or the consumer. However, recent scholarship warns against attempts to identify style

[69] Dezsö 2012: pls 26–32.
[70] Summerer 2010: 158–59, fig. 21.
[71] Mongiatti, Meeks and Simpson 2010 detail how the object was made and how it was later reconstructed, and the stance of the charioteer in particular may not be original; see also Wu 2005: 252, n. 615 with references. The motif of a chariot riding *kandys*-wearer is also shown on a cylinder seal in the museum of Baden in Karlsruhe of which a good photograph is published: http://www.achemenet.com/en/item/?/achaemenid-museum/museums-and-institutions/badisches-landesmuseum/2588420
[72] Siamak 2018.
[73] Wu 2010: 549, figs 51.3, 51.8.
[74] Kaptan 2002: 107–70.
[75] Rehm 2013.

Figure 16. The so-called 'Darius seal' (The British Museum, inv. nr. 89132; reproduced by courtesy of the Trustees of the British Museum)

with ethnicity and pleads for a more balanced view of the matter. As an aspect of socially generated symbolic art, style can bear testimony to artistic networks, as well as cultural and sociopolitical connections, but not to ethnic identities.[76] In line with these arguments the term 'Achaemenid hegemonic style', introduced by Elspeth Dusinberre, moves away from the premise of style as ethnic and geographic identity towards a consideration of style as an identifying feature of a socio-political context.[77]

However, even if the style itself is difficult to locate, the iconographic inconsistencies on the comb clearly indicate a wood-carver who was not properly familiar with the conventional iconography and styles of the Achaemenid heartland. Similarities between its chariot–war image and the Tatarlı painting initially connect the Taksai comb with the western part of the empire in Anatolia, but the use of poplar wood (the same material as in the roof of the tomb chamber where it was found) might prefer local production. So, although the Tatarlı and Taksai battle friezes share the theme of Persian victory, as well as some formal characteristics including the presence of a chariot and the postures of the Persian protagonist and his enemy, they should not be seen as having a direct relation with one another. Instead, the truth is probably that each of the artists involved independently copied and adapted motifs from glyptic imagery which circulated within as well as beyond the Achaemenid empire.

But why did they choose to portray combat involving a chariot instead of the infantry battle scene so common on seals? This crucial question still requires an answer. Chariots had dominated battles across the entire Near East during the Bronze Age because they offered an optimum mobile platform for bowmen, and they were still of some importance during the late Assyrian period.[78] However, during the first half of the 1st millennium BC their role was increasingly replaced by cavalry: thus the number of chariots on the battlefield dropped whereas horse-archery grew in importance as their greater mobility and manoeuverability made horse-archers a more effective weapon.[79] This is very likely the reason why chariots are generally absent in Achaemenid representations of warfare but leaves the subject of the Taksai and Tatarlı compositions unexplained. Perhaps the answer lies in the one context in which the chariot made a comeback. The 5th century BC Persian army was famous, even infamous, for its scythed chariots: these were no longer a platform for archers but, with blades extending horizontally at an angle from the wheels on each side, a means of breaking infantry lines and had been specially introduced in response to the heavy Greek phalanx encountered during the Greco-Persian wars.[80] The designers of the Taksai comb and the Tatarlı painting may have had at least hearsay knowledge of such chariots and attempted to demonstrate Persian military power with this frightening new piece of military machinery but, since existing Achaemenid iconography did not offer a model for a battle scene involving a scythed chariot (or indeed a scythed chariot in any context), they substituted it with a chariot from a procession.

Conclusions

The wooden comb of the 'golden lady' carved with a battle scene showing Persian victory over a Eurasian or central Asian enemy is an ideologically charged object

[76] Gates 2002; Dusinberre 2008: 92; 2010: 325; 2013: 259–71.
[77] Dusinberre 2008: 93.
[78] Dezsö 2012: 55–68; Trimm 2017: 202–27.
[79] Nefedkin 2005: 14: 'the chariot was the ancestor of the horse-archer'.
[80] Xenophon *Hellenica* IV.1.17–19: 'Pharnabazus came upon them [the Greeks], scattered as they were over the plain, with two hundred scythe-bearing chariots and about four hundred horsemen. Now when the Greeks saw him advancing upon them, they ran together to the number of about seven hundred; Pharnabazus, however, did not delay, but putting his chariots in front, and posting himself and the horsemen behind them, he gave orders to charge upon the Greeks. And when the chariots dashed into the close-gathered crowd and scattered it, the horsemen speedily struck down about a hundred men, while the rest fled for refuge'; cf. Littauer and Crouwel 1979: 152; Nefedkin 2004.

and biased in favour of Achaemenid rule. In carving technique, iconography and style the battle frieze follows artistic traditions from the Achaemenid empire, yet the carver of the comb transforms the models and conventions of normal Achaemenid iconography by combining a combat scene with a chariot scene adapted from procession imagery. The artist was not directly familiar with the artistic traditions of the Achaemenid heartland. It is possible that the comb was produced in Asia Minor, where we find the only parallel for a Persian chariot battle but the poplar-wood from which the comb was carved, as well as the openwork technique, instead suggest local production.

The comb was owned by the 'golden lady' who surely belonged to a local elite. She was buried in local funerary tradition, but with an attire richly decorated with gold and with gold jewellery of Persian style. The comb was part of a grave assemblage which included other Achaemenid or Achaemenid-inspired items, such as perfume bottles of polychrome glass and alabaster vessels. In construction, ritual and inventory the tomb at Taksai-1 shares many characteristics with other burials in the southern Ural region. Analogies for its grave assemblage appear especially in the Lebedevka-II, Kyryk Oba-II and Pjatimary graves in western Kazakhstan. In a book edited by Michail Treister and Boris Yablonsky a corpus of as many as 80 Achaemenid or Achaemenid-inspired items – jewellery, vessels of bronze, glass and stone, harnessing elements, and dress ornaments – found in early nomadic graves in the southern Ural piedmont is presented.[81] With the discovery of Taksai-1 this corpus has now grown even further.

The southern Ural piedmont is traditionally associated with the Sauromatians, a collective ethnonym used for all nomadic people living in the vast region east of the Don at the time of Herodotus.[82] However, recent studies see the inhabitants of this region as multi-ethnic and favour the more neutral term of early nomads of the southern Ural piedmont.[83] While the Bronze Age in the southern Ural region is archaeologically well evidenced, there seems to be a hiatus in the first half of the 1st millennium BC.[84] It has been suggested that new nomad groups came into the region during the 6th century BC.[85] The earliest archaeological evidence of this immigration is a group of kurgan burials of the late 6th or early 5th century BC, of which Taksai-1 is part. Grave-goods of Achaemenid origin not only appear in these earliest burials of the nomadic elite, but also in the increasingly splendid later royal graves of the late 5th and 4th centuries.[86]

In comparison with other regions of Eurasia, including provinces ruled by the Achaemenids, the quantity of Achaemenid imports in the southern Urals is striking and requires explanation. In the concluding chapter of the book mentioned above, Treister and Yablonsky recapitulate the hypotheses of previous scholars in search of an answer to the question as to why and how these objects reached the southern Urals.[87] The different explanatory models on offer can be subsumed in four main categories: trade through caravan routes, payment for mercenary services, spoils of war and mixed marriages.

The southern Ural region must have attracted the interest of Achaemenids because of its gold deposits but the exact nature of imperial authority in the region remains obscure. The relationship between Ural nomads and Persians was surely not limited to exchange of prestigious goods. The evidence of the Taksai comb shows that even the ideologically charged imagery of Achaemenids penetrated into the society of the local elite nomads of this region and implies that the southern Ural piedmont were part of a socio-political environment in which an image propagating Achaemenid ideology was not only acceptable but perhaps even desirable.

[81] Treister and Yablonsky eds 2013.

[82] The ethnonym Sauromatae was mentioned by Herodotus, *The Histories* 4.21: 'Cross the River Tanaïs, and you are no longer in Scythia, but among new divisions of territory, of which the first belongs to the Sauromatians; the land they inhabit, that starts at the corner of Lake Maeotis [Sea of Azov], and extends northwards for fifteen days' journey; is wholly devoid of either wild or cultivated trees. Beyond the Sauromatians, in the second tract of territory, live the Boudinians, whose land is completely forested with every kind of tree'; see also Yablonsky and Balachvancev 2013: 25–26.

[83] See the extended discussion by Yablonsky and Balachvancev 2013.

[84] Koryakova and Epimakhov 2007; Treister and Yablonsky eds 2013: 320.

[85] According to Treister and Yablonsky (2013: 320), the hypothesis of a Scythian immigration is not convincing. The immigration of Asian nomads to the Urals was possibly prompted by the campaigns of the Achaemenid army in central Asia against the Massagetae in 530 BC and Scythians in 521 BC; see also Koryakova and Epimakhov 2007: 236.

[86] Treister 2013*a*.

[87] Treister and Yablonsky eds 2013: 322.

Finds from the Noin-Ula kurgans at an exhibition in Berlin in 1929 (based on materials from the archive of the Russian Academy of Sciences, Institute of the History of Material Culture)

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Abstract

The discovery in 1924/25 of Xiongnu burials in the mountains of Noin-Ula in northern Mongolia caused a revolution in the knowledge of Russian and foreign researchers about the art, diplomacy and politics of ancient China. The exhibition of ancient Chinese art in Berlin was the first time that the Noin-Ula collection had been shown in Europe. For the first time European scholars were able to read the inscriptions on the Chinese cup which determined the dating of the kurgans. Photographs of the artefacts taken during the preparations for the exhibition enable us to reconstruct some of the archaeological complexes. The material in this article provides information about the initial stage of international museum collaboration in the Soviet state.[3]

Keywords: Noin-Ula; ancient Chinese art; lacquered cup; foreign exhibition; archaeological complexes

Introduction

Among the most outstanding archaeological discoveries in the first half of the 20th century were the rich burials of the nobility of the Xiongnu in the mountains of Noin-Ula in northern Mongolia. The burials were excavated by the Mongolia-Tibetan Expedition led by Pyotr Kozlov in 1924–1925. Several thousand artefacts were found in the ancient tombs, including those made by Chinese masters. The materials discovered in northern Mongolia immediately attracted the attention of Russian and foreign archaeologists, orientalists and art historians. Pyotr Kozlov, a brilliant orator and popularist, gave a great deal of information about the excavations in reports to various scientific gatherings and in print.[4] However, contrary to established tradition, he did not write a final account at the end of the expedition. Instead 'Short Accounts of the Expedition for the Exploration of Northern Mongolia in Connection with the Mongolia-Tibetan Expedition of P.K. Kozlov' were published: a short summary of the explorations and a few photographs of the most attractive finds.[5] The absence of a full scientific account of the discoveries made, which completely changed scholars' concepts of the ancient history of central Asia, caused a certain tension in scientific circles. Information about the kurgans excavated at Noin-Ula appeared in European publications in the form of translations and rehashes of Kozlov's articles and short analytical articles.[6] Letters with requests to inspect the archaeological materials from Mongolia, requests for photographs of the artefacts and for the publication of the finds arrived from various European countries. However, permissions were granted reluctantly: the matter of the future storage of the artefacts was being decided, it was necessary to fulfil the obligations to the Mongolian side, and a catalogue of the finds was in preparation.

The great scientific importance of the archaeological monuments discovered in the mountains of Noin-Ula and the desire to see materials from the excavations led German specialists from the Society of East Asian Art to submit an official proposal to the USSR government to take part in an exhibition of Ancient Chinese art in Berlin in 1929. There is virtually no mention of this exhibition in Soviet scientific literature,[7] though it was a unique opportunity to show the artefacts from the Noin-Ula kurgans in Europe before they became part of the permanent collection of the State Hermitage Museum. There are documents in the Manuscript Department of the Institute of the History of Material Culture of the Russian Academy of Science (henceforth IHMC RAS) which fully reflect the preparations for the exhibition: correspondence between scientific institutions and government bodies, lists of exhibits with their numbers in the Book of Acquisitions of the State Academy of the History of Material Culture, papers concerning the restoration of artefacts and their transportation to Germany. There are photographs of

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[4] Kozlov 1925: 7–11; 1926: 51–56; 1928: 1–4; Yusupova 2011: 24–41.
[5] *Kratkiye Otchyoty* 1925.
[6] Yetts 1926*a*; 1926*b*.
[7] Bernshtam 1951: 33; Sutiagina and Kukina 2017.

objects taken during the mounting of the exhibition in Berlin in the Photographic Department of the Scientific Archive of the IHMC RAS.[8]

The main purpose of this paper is to bring these archival documents into the academic domain. The inventories and photographs of the artefacts make it possible to imagine the original appearance of the finds and to amend and reconstruct the archaeological complexes that have been partly confused in the course of the subsequent treatment of the collection. Some objects featured in the 1929 photographs are little known as they were not included in the general publications of materials from the Noin-Ula excavations,[9] are not tied to any particular kurgan or have been erroneously attributed. The information we have obtained broadens our knowledge of the history of the study, storage and display of the Noin-Ula collection, the composition of the complexes and the external appearance of the finds. In addition, these materials are interesting for a study of how international exhibitions were organised in the Soviet Union in the 1920s.

The 1929 Berlin exhibition

A letter of 16th July 1928 informed the People's Commissariat for Education of the RSFSR that an exhibition of Ancient Chinese art was being planned for January to April 1929 in the Prussian Academy of Arts in Berlin. The organisers requested artefacts from the kurgans in the mountains of Noin-Ula to be included in the display:

> 'The Society of East Asian Art is planning to organise a large-scale exhibition of Ancient Chinese art in the winter of 1929, approximately from 15/I to 15/IV. Leading collectors from Germany and other European and non-European countries will be taking part. The exhibition is intended to provide a review of new discoveries in Chinese art in the past 25 years. To a known degree it will represent instructive coverage of what has been achieved in this field all over the world in that time.
>
> The exhibition will be organised jointly with the State Academy of Arts in the Academy's exhibition halls in Pariser Platz, not far from the USSR Embassy. The venue is totally safe from fire risk, is guarded around the clock as a state building and provides a reliable fortress for the appropriate display of valuable items. The Ministry of Internal Affairs and the Prussian Ministry of Science, Art and Public Education is providing financial support for the exhibition. Our exhibition would, unfortunately, be incomplete and suffer from gaps if we were to be unable to give an idea of the exceptional research work in this field in the USSR.
>
> Above all, it is the excavations of Kozlov and his colleagues in Mongolia which interest us in this regard. They have aroused enormous interest throughout the world and have proved a historical and economic link between the West and the Far East of which we previously had no idea. The finds are currently being processed in the Academy of the History of Material Culture in Leningrad. Those that would be most appropriate for our exhibition are purely Chinese objects which reveal hitherto unknown aspects of Chinese material culture.
>
> Above all, we are interested in the report of the exploration of Mongolia arising from Pyotr Kozlov's expedition.
>
> Figures 12, 13, 15[10]
>
> Table 1 below. Tables 2, 3, 6, 7
>
> These items are easily transported and are not liable to breakage. We would cover all the expenses of a Soviet representative nominated by you to accompany these items to Berlin. We would particularly welcome either the Academy's Secretary Mr. Oldenburg, who is our Corresponding Member, or Mr. Borovka, who is a Fellow of our Society.
>
> Apart from that, of course, the artefacts will be fully insured during transportation and at the exhibition. The return transportation could be accompanied by a courier from the Russian Embassy or a member of staff of the German Ministry of Foreign Affairs.
>
> We therefore apply to you with a formal request to agree to the provision of the abovementioned items for the exhibition.
>
> Please accept, most respected President, the expression of our profound respect ...'[11]

At that time the materials from Noin-Ula brought from Mongolia by Pyotr Kozlov's expedition were kept in the Repository of Antiquities at the State Academy of the History of Material Culture: they had been accepted for storage there by 1925 and were in the Repository

[8] Photographic Department of the Scientific Archive of the IHMC RAS O.759.

[9] Trever 1932; Umehara 1960; Lubo-Lesnichenko 1961; Rudenko 1962*a*.

[10] These numbers of plates and figures are noted according to *Kratkiye Otchyoty* 1925. The German scientists could operate only this information during the preparation of the exhibition so they wrote the numbers of all objects they wanted to exhibit in official letter published here entirely.

[11] Manuscript Department of the Scientific Archive of the IHMC RAS: On the study of the collections of the Mongolian-Tibetan Expedition of 1928/Fonds 2/Inventory 1/File 76/1928/p. 15 and reverse.

of Antiquities until 1930, when the Repository of Antiquities was liquidated and the artefacts from the Noin-Ula collection were temporarily transferred to the Ethnographic Department of the Russian Museum.[12] From 1931 the collection and accompanying documentation began to be relocated to the State Hermitage Museum.[13]

Grigory Borovka, who had been sent on the expedition by the Academy of Sciences in 1925, was at that time a member of the Institute's staff and, at the same time, curator of the Hermitage's Section of Hellenic-Scythian Antiquities. A request from the Kremlin (No. 1255) to the Academy dated 9th August 1928 was addressed to him:

> 'The Department of Scientific Institutions of the USSR Council of People's Commissars encloses a copy of a letter received from the Society of East Asian Art in Berlin on the matter of the organisation of an exhibition of Ancient Chinese art in Berlin in winter 1929 and requests you to communicate your decision in this matter...'.[14]

Shortly afterwards, on 18th August 1928, similar letters were sent to the State Academy of the History of Material Culture and to the Russian Museum. A response to the request was required before 22nd August 1928.[15] The decision of the Academy was prepared and despatched to the Department of Scientific Institutions on 20th August 1928:

> 'The State Academy of the History of Material Culture notifies that it finds it desirable to comply with the request of the Society of East Asian Art to provide antiquities discovered by Kozlov's expedition to Mongolia for the exhibition of Ancient Chinese art which the Society is organising in Berlin. The Academy will take the necessary measures to ensure the safe passage of the aforesaid materials to Germany. N. Marr, President of the Academy'.[16]

Despite the fact that Pyotr Kozlov's expedition was organised by the Russian Geographical Society, information about the planned exhibition was received in that institution only at the end of 1928. Members of the Mongolian Commission of the USSR Academy of Sciences were officially notified at the same time as the Russian Geographical Society.

> 'The State Academy of the History of Material Culture has received a request from the Society of East Asian Art to provide antiquities discovered during excavations in Mongolia for the exhibition of Ancient Chinese art which the Society is organizing in Berlin. The Academy, in agreement with the Department of Scientific Institutions of the USSR Council of People's Commissars, recognizes the desirability of acceding to the aforesaid request and asks you not to decline to notify whether there are any obstacles from your standpoint to the despatch of these items to Berlin for the exhibition to be held approximately from 15.I to 15.IV 1929'.[17]

Although it expressed some doubts regarding the unfinished scientific processing of the collection, the Russian Geographical Society nevertheless approved the display of the finds from Noin-Ula at the exhibition in Berlin, 'where they will provide evidence of the results of our extensive scientific work'.[18]

When organisational matters had been agreed among the scientific institutions a positive reply was sent to Germany. At the very beginning of 1929 all the items were ready for despatch to the People's Commissariat of Foreign Affairs in Moscow and further transportation to Berlin.[19] Grigory Borovka was sent to Germany to accompany the items and to take part in scientific events devoted to the opening of the exhibition.[20]

A hundred of the most interesting and well-preserved artefacts, primarily of Chinese manufacture, were selected for the exhibition. The list of exhibits was drawn up in Russian and German.[21] It indicated the titles and dimensions of the artefacts, from which kurgan they came and their inventory numbers in

[12] Manuscript Department of the Scientific Archive of the IHMC RAS: Commission for the Liquidation of the Repository of Antiquities (Transfer according to deeds)/Fonds 2/Inventory 1/File 750/1931/pp 19–20, 30 and reverse of p. 20

[13] Archive of the State Hermitage Museum, Direction and Scientific Section: Lists and deeds of transfer to the Hermitage of museum items with noting in the inventory from institutions and private individuals/ Vol. 1/Fonds I/Inventory V/File 1191 (1)/1931/pp. 209–23.

[14] Manuscript Department of the Scientific Archive of the IHMC RAS: On the Study of the Collection from the Mongolian-Tibetan Expedition of 1928/Fonds 2/Inventory 1/File 76/1928/p. 14.

[15] Manuscript Department of the Scientific Archive of the IHMC RAS: On the Study of the Collection from the Mongolian-Tibetan Expedition of 1928/Fonds 2/Inventory 1/File 76/1928/p. 17.

[16] Manuscript Department of the Scientific Archive of the IHMC RAS: On the Study of the Collection from the Mongolian-Tibetan Expedition of 1928/Fonds 2/Inventory 1/File 76/1928/p. 16.

[17] Manuscript Department of the Scientific Archive of the IHMC RAS: On the despatch of artefacts from the collection of Pyotr Kozlov's Mongolian-Tibetan expedition for the exhibition in Berlin/ Correspondence/Fonds 2/Inventory 1/File 86/1928–1929/p. 1.

[18] Manuscript Department of the Scientific Archive of the IHMC RAS: On the despatch of items from the collection of Pyotr Kozlov's Mongolian-Tibetan expedition for the exhibition in Berlin: Correspondence/Fonds 2/Inventory 1/File 86/1928–1929/p. 8.

[19] Manuscript Department of the Scientific Archive of the IHMC RAS: On the despatch of items from the collection of Pyotr Kozlov's Mongolian-Tibetan expedition for the exhibition in Berlin/ Correspondence/Fonds 2/Inventory 1/File 86/1928–1929/p. 3.

[20] Archive of the State Hermitage Museum: Official file of G.I. Borovko/19th September 1917–26th November 1930/Fonds I/ Inventory 13/File 103/pp. 87, 88, 95.

[21] Manuscript Department of the Scientific Archive of the IHMC RAS: On the despatch of items from the collection of Pyotr Kozlov's Mongolian-Tibetan expedition for the exhibition in Berlin/ Correspondence/Fonds 2/Inventory 1/File 86/1928–1929/reverse of pp. 4–5, 22–23.

the Repository of Antiquities where they were kept that time. Most of the items, primarily textiles, were restored before their despatch to Germany.

The exhibition of ancient Chinese art was held in the Prussian Academy of Arts. The organisers provided one of the largest rooms in the building for the display of ancient artefacts from Mongolia. Articles, photographs and short annotations were published in a small catalogue entitled 'Ausstellung Chinesischer Kunst'.[22] This event in the cultural life of Germany and Europe was a huge success and received numerous positive reviews. Special attention was devoted to the finds of Pyotr Kozlov's expedition at the exhibition.[23] It was actually from this year that the materials became generally accessible for inspection and study and entered the European and world scientific domain.

The exhibit that particularly attracted the attention of specialists was a Chinese lacquered cup from kurgan 6 ('Upper'), with a hieroglyphic inscription. Earlier, in 1925, Professor Otto Kümmel had read the inscription on the bottom of the cup and was the first to suggest a translation of it – this enabled the cup to be dated to 2 BC.[24] The opportunity to examine the find in Berlin enabled scholars to agree on the dating of the kurgans. Other finds that attracted attention were details of Chinese chariots (spokes of a canopy covered with dark Chinese lacquer and bronze terminals of various types) (Figure 1), silver and bronze harness details, the fragment of a bronze Chinese mirror, lacquered objects ('er bei' cups with handles (Chinese 耳杯), coffin decorations and wooden details), leather ribbons/belts, artistic objects of jade and amber, wooden sculptures, silk 'flags' and a panel with festoons, silk cases for plaits, fragments of the famous felt rug and fragments of a velvet saddle cover. Attention was drawn particularly to the numerous examples, totalling over 70 pieces, of woollen and silk textiles. The display featured items of clothing, details of footwear, woollen embroidery depicting horsemen and individual fragments of embroidery depicting men's faces. The diversity of Chinese silks found in the nomadic burials was reflected in the wide range of polychrome textiles, embroidery and gauze on display.

The photographs of artefacts in the Photographic Department of the Scientific Archive of the IHMC RAS not only show lists of exhibits but also provide important information regarding the state of preservation of the finds in the late 1920s and the excavated kurgans where they were found. One of the most famous examples of ancient Chinese art is a silk cloth depicting mountains, birds, a tree and mushrooms (MP-1330). There is a view in the literature that this textile was from the

Figure 1. Details from the canopy of a chariot from the Kondratiev kurgan in the Tzurumte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O.759-46)

'Upper' kurgan (kurgan 6).[25] However, the inventory entry on the photograph and the documentation of the collection shows that the fabric came from another burial. It was found during the excavation of kurgan 12/24 led by Sergey Teploukhov, along with other items (Figures 2–5).[26] The error in attribution probably occurred in the process of the transfer of artefacts to the State Hermitage Museum, as the correct kurgan is indicated in the catalogue of the collection compiled by Kamilla Trever and in the research of Sueji Umehara.[27] A photograph was also found of an amber artefact that came from the Ballod kurgan (Figure 6). This tomb was excavated by Alexander Ballod in 1913. All of the finds, including this amber piece, were despatched to the East Siberian Branch of the Russian Geographical Society in Irkutsk according to the inventory attached to the package. Alexander Ballod enclosed a drawing of this item in letters addressed to members of the

[22] *Ausstellung Chinesischer Kunst 1929.*
[23] Yetts 1929*a*: 128, 133; 1929*b*: 337–39.
[24] Yetts 1929*a*: 128.
[25] Menshikova 2011: 30.
[26] Photographic Department of the Scientific Archive of the IHMC: RAS O.759/Borovka G.I./Exhibition of Chinese Art in Berlin. State Hermitage Archive: Transfer to the Hermitage of museum items from various institutions and private individuals and their recording in the Hermitage Museum's inventory/Fonds I/Inventory V/File 1789 (78)/1934/p. 112.
[27] Trever 1932: 35, pl. 15; Umehara 1960: 73, fig. 51.

Figure 2. Fragment of silk fabric from kurgan 12/24 (Teploukhov's) in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-29)

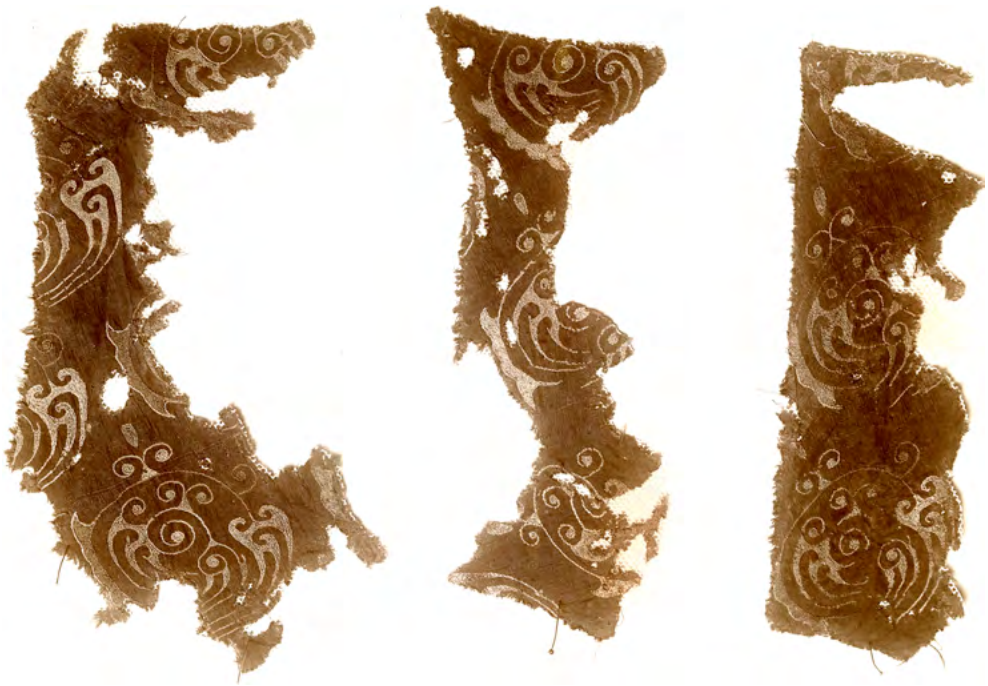

Figure 3. Fragments of silk fabric with embroidery from kurgan 12/24 ('Teploukhov's') in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-30)

Branch in Irkutsk and to the scientific institutions in St. Petersburg and Moscow.[28] However, in 1929 the piece was in Leningrad among Pyotr Kozlov's finds.

Besides these well-known objects, the archive photographs also feature leather belts, fragments of the famous felt rug before restoration and fragments of fabrics from kurgans 6 (Figures 7–16), 23 and 25 (Figures 17–21). Most of the fabrics were studied and published by Evgeny I. Lubo-Lesnichenko,[29] unfortunately with no indication of the kurgans from which they came. The photographs also show several finds from the

Figure 4. Fragment of silk fabric with embroidery from kurgan 12/24 ('Teploukhov's') in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-31)

[28] Sutiagina 2014: fig. 2: 6.
[29] Lubo-Lesnichenko 1961.

Figure 5. Fragment of silk fabric with embroidery from kurgan 12/24 ('Teploukhov's') in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-32)

Figure 6. Amber artefact from the Ballod kurgan in the Tzurumte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-47)

Figure 7. Fragments of ribbons from kurgan 6 ('Upper'), Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-16)

Figure 8. Fragment of felt rug with silk edging from kurgan 6 ('Upper'), Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-4)

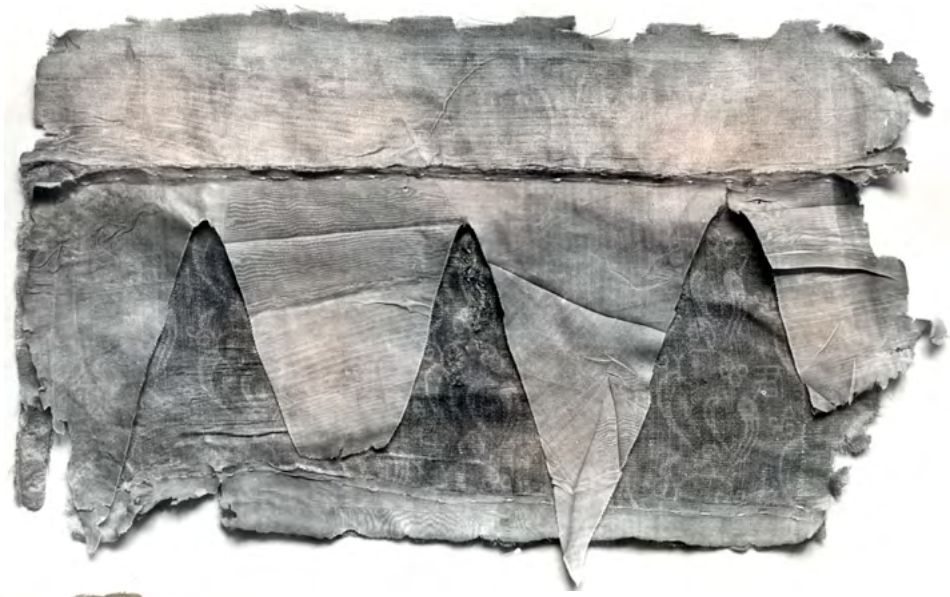

Figure 9. Fragment of a silk sewn item with festoons from kurgan 6 ('Upper') in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-6)

Figure 10. Fragment of a silk sewn item with festoons from kurgan 6 ('Upper') in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-20)

Figure 11. Fragment of silk fabric with embroidery (tiger and dragon) from kurgan 6 ('Upper') in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-8)

Figure 12. Fragment of tulle with rhomboid ornament from kurgan 6 ('Upper') in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-9)

Figure 13. Sewn fragments of silk fabrics with embroidery from kurgan 6 ('Upper') in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-15)

Figure 14. Plait in a silk case with a small pouch from kurgan 6 ('Upper') in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-13)

Figure 15. Artefact of patterned silk with a small pouch from kurgan 6 ('Upper') in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-26)

Figure 16. Fragment of silk fabric from a silk artefact with a small pouch from kurgan 6 ('Upper') in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-27)

Figure 17. Fragment of decorated silk fabric from kurgan 23 in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-33)

Figure 18. Fragment of silk fabric with embroidery from kurgan 23 in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-34)

Figure 19. Fragment of silk fabric with embroidered decoration from kurgan 23 in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-35)

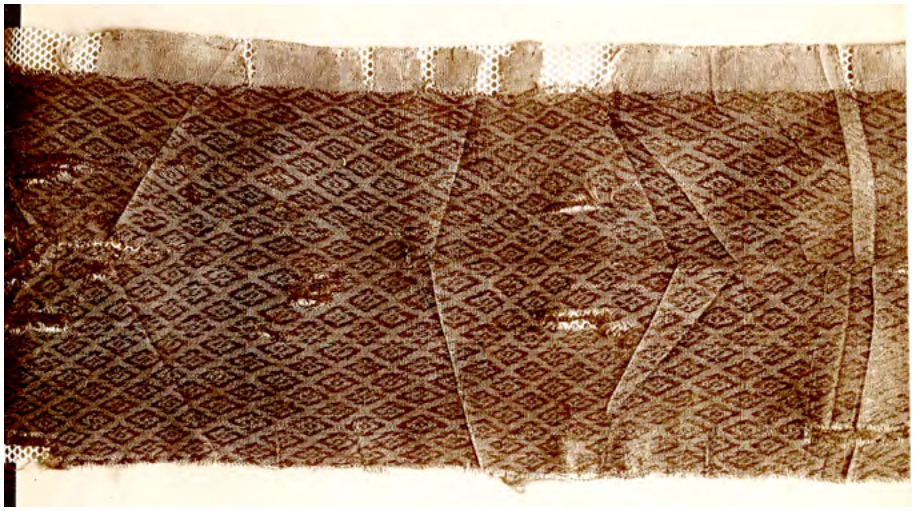

Figure 20. Fragment of silk fabric from kurgan 25 in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-38)

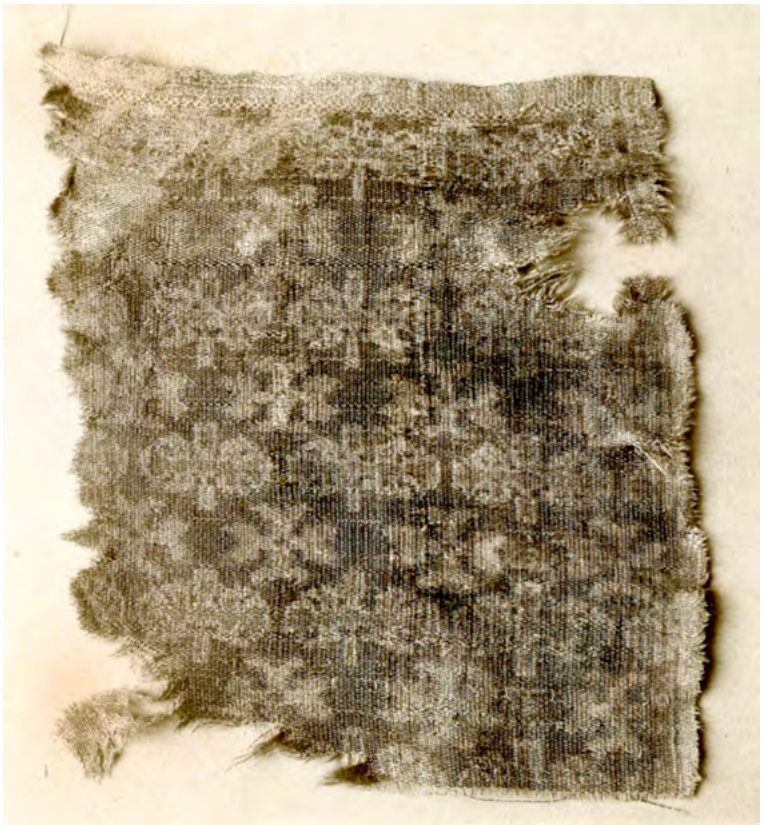

Figure 21. Fragment of silk fabric from kurgan 25 in the Sudzukte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-40)

Figure 22. Fragment of silk fabric from the Kondratiev kurgan in the Tzurumte Pass, Noin-Ula (SA IHMC RAS Photographic Department Imp. O. 759-44)

Figure 23. Pieces of harness from kurgan 49 in the Sudzukte Pass. Excavations of Grigory Borovka in 1926 (SA IHMC RAS Photographic Department Imp. O. 759-42)

Kondratiev kurgan (Figures 1, 22). One shows a set of harness from a kurgan excavated by Grigory Borovka in 1926 (Figure 23). A sketch of one of the items was published by Sergey Rudenko,[30] but the other pieces remained unknown.

Conclusion

These materials enable us to view and re-assess the initial stage of research of one of the most outstanding collections now kept in the reserves of the Oriental Department of the State Hermitage Museum. The archival materials show how substantial and profound was the appreciation of the very high scientific value of the Xiongnu burials in the mountains of Noin-Ula. Soviet and European researchers realised the urgent necessity of bringing as many artefacts as possible from this collection into the scientific domain for a thorough study of the history of central Asia in the light of the latest archaeological discoveries. Despite the difficult political situation of the time they succeeded in creating conditions of maximum access to the collection for scholars and visitors. The very process of the organisation of international exhibitions in the late 1920s is very apparent on the basis of this historical example: correspondence, lists of exhibits, conditions of storage and transportation – the initial stage of what is now the norm for mounting exhibitions in a modern museum. Thanks to the archival documents of the IHMC RAS it is possible to clarify and correct information about the provenance of the artefacts, their original appearance and completeness, and to see the enormous amount of work by several generations of curators and restorers to ensure that the finds from the ancient kurgans of Noin-Ula now grace the permanent display of the State Hermitage Museum.

[30] Rudenko 1962*a*: 64, fig. 53.

The Scythian empire: reassessing steppe power from western and eastern perspectives

Timothy Taylor,[1] Christine M. Havlicek,[2] Christopher I. Beckwith[3]

Abstract

Archaeologically speaking, the Scythian phenomenon can be characterized by the widespread appearance of a more or less materially distinct culture, consistent with the activities of a nomadic society known from Classical Greek, Chinese, and Near Eastern sources as having been especially significant (economically and militarily) between the 8th and 3rd centuries BC. Although 'the Scythians' have been assumed by many to have been an undifferentiated pastoralist-focused steppe economy, one might alternatively see in them the emergence, crystallization or recrystallization of an ideology of pan-Eurasian – ideologically globalizing – hegemony. A cursory look at the contents of excavated Scythian 'royal tombs' would not lead one to immediately identify a periphery, but rather a hub for the concentration of wealth and power. In this paper we look at both ends of the steppe zone in the Scythian period to assess whether what lay between and connected them was simply a few galloping horses with flashy bridles or, rather, an unfolding, stratified, complex, and broadly 'state level' social formation.

Keywords: Scythians; central Eurasia; steppe archaeology; nomad empire

Introduction

Perhaps the most striking aspect of the *Scythians: warriors of ancient Siberia* exhibition and conference at the British Museum (2017/18) was its demonstration of the breadth and diversity of the Scythian topic. The programme announced that the conference would 'evoke the world of the steppe, a natural open corridor without borders, which connected China and Europe' – and it did. But the contributions were not confined even to the vast expanses of the Eurasian steppe: many featured what might be termed 'Scythian' elements in the art and archaeology of neighbouring sedentary cultures, including Persia, India and China. The geographical and cultural spectrum illustrated beautifully that 'Scythians' are more than just a steppe phenomenon, and that their influence was felt in many ways far beyond steppe boundaries. In the past decades, the field of what researchers consider part of the Scythian topic has widened considerably, as the older, and largely historical, interpretation of things 'Scythic' has been replaced by a largely archaeological one.

The ubiquity of the Scythian phenomenon in Eurasia seems now to be recognized widely, if only from an archaeological or art historical perspective concerned with the widespread recording of 'steppe style' artefacts and steppic assemblages; on the other hand, without the historical perspective there would be a circularity in the construction or imputation of entities such as Scythian art, to which could be attached some well-defined ethnicity of 'Scythians', which then appear to be widespread.[4] Against this, regional archaeologies have emerged within the Former Soviet Union which have started to favour other cultural identifiers. 'The Pazyryk' is perhaps the best-known example of this,[5] being a modern exo-ethnonym derived from the Altaic type site excavated by Rudenko (and later Griaznov) from the 1950s onward, and considered by him to represent the burials of high status Scythians, perhaps (reasonably enough) the 'émigré Royal Scythians' of Herodotus.[6] It is possible to argue that the emergence of 'the Pazyryk culture' as a distinct facies of Iron Age steppe nomadic culture has as much to do with modern political identity claims connected to heritage presentation regionally as with any emically perceived identities in the past. Despite such tendencies to qualify and narrow down cultural identifiers, the term *Scythian* remains by far the most common designator for the presence of the material culture phenomenon associated with early steppe nomadic pastoralism; and it is the examination of what is embedded in, and lies behind, this term – definitions, concepts, and biases – that is our subject here.

Ethnicity and nomenclature

With archaeology as the main source of information on ancient nomadic steppe inhabitants, having a clear-cut and broadly applicable archaeological definition

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[4] Taylor 1996.
[5] Pilipenko, Trapezov and Polosmak 2015.
[6] Rudenko 1970; Taylor 1994.

of the term *Scythian* (or the alternative, *Scythic*) would seem to be a necessity, but there is none. As a whole, the phenomenon remains poorly described and under-theorized as a historical or systematising concept. To date, a generally accepted definition of the term cannot be said to exist in any field. The current breadth of the 'Scythian' topic may even partly be explained by this lack of a definition. It might be useful here to analyse what Herodotus, who provides perhaps the most extensive descriptor of 'Scythians', can be thought to have observed.

The sources of Herodotus's concepta, and his mode of access to 'knowledge of the Scythians', is obviously the subject of detailed discussion in itself, and only a few key aspects will be presented here.[7] It may, however, be useful to note the issue of the 'Mark Twain question' concerning history, truth, fiction and social commentary[8] – bluntly put, Herodotus's hearers consisted of a knowing audience, containing many whom we must suppose had direct experience of the Pontic settlements and relations with the interior. Had Herodotus (to use Huck's language) 'stretched' things too far and too often, his audience would have found him out, and thus found him uninteresting. His contemporary fame speaks against this (even if younger rivals, like Thucydides, carped).

Herodotus appears to use a four-dimensional assessment of ethnic identity in his discussion of various peoples of the Pontic region, taking into consideration language, location, customs and appearance. This last combined the inherited and the inculcated: both what we would consider genetic, biological features (such as light-coloured eyes or reddish hair) and culturally determined features like mode of dress or preferred material technology (Scythians only drinking from golden vessels, for example). The picture is thus a complex one and may at first sight not seem wholly consistent. However, by paying close attention to the context and purpose of the various observations made in Book 4 and elsewhere in the *History*, solutions for many of the apparent inconsistencies can be proposed (examples follow below), and the whole understood as a sophisticated attempt to present a highly complex, ever-changing socio-political situation during a period of intense ethnic interrelationship, as the opposed Greek and Persian worlds contended with the blunt fact that there was an increasingly powerful entity 'out there', to their north; one which they inevitably perceived as both enigmatic and alien. (It might be argued that the exoticism of the Scythians begins here, and continues even now to obscure the real nature of the socio-economic and cultural phenomena in question).

Given the vividness of Herodotus's account of 'the Scythians', especially in the famous passages that describe death rites with attendant mass ritual killing (we avoid the word *sacrifice* for reasons discussed below) of humans and animals, it was always going to be this ethnonym that was applied to the contents of the great Iron Age burial mounds of the Dnieper bend, Kuban and Crimea, once these had captured the systematic attention of grave robbers, antiquarian scholars, and (eventually) scientifically-trained archaeological investigators. A conjunction thus came into being that could be unproblematically used to label monuments in the landscape and objects in museum collections and seemed straightforward, but was (and is) anything but. This conjunction effectively takes 'Scythian' as a lowest common denominator in a consilience-based approach. It creates an equation between the textual records and the archaeologically-recovered material culture and presents a monolithic (even monothetic) entity of a kind eminently suitable for deployment as a romantic and unifying myth in the presentation of the past by modern political formations (such as the Russian Empire, the former USSR, or the Ukrainian nation).

The danger of reductivism in this is obvious, as we must constantly read across from one kind of record to another, ignoring discrepancies: there are many bronze drinking vessels in 'Scythian' graves, so what does it mean for Herodotus to say that only gold was thought suitable? (A possible answer follows, below.) The lowest common denominator approach leads us inevitably to lose data, nuance and detail. This criticism is not made naively either: the very structure of reference publications may force the available data into a particular ethnonym-led format, which contributors are obliged to adopt, caveating as much as they can;[9] the problem applies to databasing too.[10] Yet alternative approaches may be equally wasteful, such as jettisoning the archaeology–text link entirely by arguing that the textual account of Herodotus and those he influenced informs us solely about Halicarnassan Greek ideas of foreignness, without regard to any culture-historical reality at all.[11]

The Herodotean multi-dimensional approach to ethnicity and identity is the subject of recent in-depth analyses.[12] Briefly here, we can conclude that it allows for a lot of potential combinations over space and time, and is part of a familiar and influential mode of description that is hardly given a second thought. For example, when Bishop Ulfila, speaking of the western steppe edge in a later phase says that the early Christian martyr, Sabbas, 'was a Goth, living in Gothia',

[7] See Sulimirski and Taylor 1991: 552 ff.; Figueira and Soares eds 2020.
[8] Taylor 2010: 137f.
[9] E.g., the *Cambridge Ancient History* chapter co-authored by one of us: Sulimirski and Taylor 1991.
[10] E.g., Turchin 2009.
[11] E.g., Hartog 1988.
[12] Figueira and Soares eds 2020.

this is not the idle emphasis of a fairy tale ('the river was full of water, and it was very wet').[13] The structure actually implies that (i) Gothia had known boundaries in space, and was thus a territory that could be mapped; (ii) Goths could live outside Gothia; (iii) by analogy with (ii), not everyone living in Gothia had to be a Goth; (iv) to be a Goth was an ethnic identifier that Sabbas himself assented to; (v) his Gothness was deemed unproblematic to those to whom it was asserted (it was uncontroversial that he was a Goth, and Ulfila assumed people would understand what that meant).

If we return, in light of this observation, to Scythia and the Scythians, we can see that even Herodotus' use of the term *Scythian* can have a variety of meanings; if we add insights from modern disciplines such as genetics or linguistics, the number of possible meanings further increase. What we may mean by *Scythian* can include the following brief formulations: (1) all or some people inhabiting the region identified as Scythia in Antiquity; (2) those people speaking the Scythian (Old North Iranic) language and its immediate descendants, perhaps including polylingualists, such as the various (rather magically, seven) interpreters described by Herodotus, used in Olbia and Scythia *sensu lato* to glean information from the far ends of the steppe zone; (3) people who were understood to lead a Scythian lifeway in Antiquity, either within Scythia (indigenes of some kind) or beyond it (such as fox-fur-wearing Athenian police);[14] (4) some more or less bounded gene-pool or observable clinal allele frequency boundaries, within which existed people with significant shared descent and distinct phenotypic characteristics – or alternatively, with phenotypically invisible adaptations (either epidemiological or in relation to lactose tolerance/intolerance, etc.) – broadly, what might once have been called the 'Scythian race'; (5) people called *Scythian* or *Saka*, including the *Sogdians*,[15] the *Hsiung-nu* (pinyin transcription *Xiongnu*),[16] and the *Skudras*;[17] (6) people who belonged to the Scythian lineage *sensu stricto*, namely those called by Herodotus the 'Royal Scythians', who continued the heritage of the first Scythian, named *Scythes* – 'Scyth'.

Scythian may also be taken to mean (7) no more than a Greek construction of otherness (as in Hartog, see above), and can be taken to mean combinations of these things in variable proportion. Unfortunately, however, it is very often the case that authors and arguments fail to specify what they mean. This is perhaps even more the case with *Scythian* than with the by now notoriously problematic sister term, *Celtic*.

Reconstructing Scythian society

Expanding on the broad idea of lifeways as potentially the most archaeologically linked classificatory type, we can consider customs, economies, habits, religious beliefs, mythology, and socio-political organisation, to have formed a recognisable package or assemblage of cultural features. This can then be understood to represent the steppe version of the 'Central Eurasian Culture Complex' (CECC).[18] The Scythian variant of it would then be the earliest to be fairly well attested historically and archaeologically, but the general CECC tradition may go back as far as the putative Proto-Indo-European migrations from *c.* 2000 BC, or even the end of the 3rd millennium BC, on the basis of indications of an earlier dating of the Seima–Turbino transcultural phenomenon with its horse focus and advanced *cire perdue* metalworking.

Scythians might also be understood as including the Cimmerians, who were apparently a distinct nation or political group of Old North Iranic-speaking people. The Cimmerians appear to be identical to the Scythians in all respects, including even language, though only a few of their names are preserved; the Akkadian form of the name 'Cimmerian', *Gimirri*, is often used by the Assyrians and Babylonians for the Scythians. Archaeologically, the Thraco-Cimmerian horizon predates the Scythian archaeological culture, being a 9th–8th century BC phenomenon, plausibly associated with the replacement of bronze by iron as the most widely circulating and produced metal, and it may be that the iron (and smelting fuel) wealth of the forest-steppe region represented one of the key trade attractions for the Greek world with its (by the mid-1st millennium BC) heavily denuded timber stocks.[19] However, to what extent this remains archaeologically coherent is an open question.[20]

Herodotus calls the Scythians the 'youngest nation' at one point, and this seems connected to a distinction between some specific eponymous group of Scythians *sensu stricto*, and other formations, lineages, or tribes of Scythian type *sensu lato*. Herodotus says the Scythians (implied *sensu stricto*) begin and take their name from a youngest son, *Scolaxais (Colaxais), i.e. from the personal name *Skola- ~ Skolo- ~ Scula- ~ Skytha- ~ *Skuδa- (Akkadian <-skuza->), the name of the youngest son of the son of Heavenly God, plus Greek <xai>, i.e. Scythian χšaya- 'ruler, king', together the name or title of the first Scythian king.[21] This implies that the paramount ruler emerges from a system of ultimogeniture

[13] See Heather and Matthews 1991: 102–13: *Passion of Saint Saba the Goth*, with commentary.
[14] See Gleba 2008.
[15] Szemerényi 1980.
[16] See Beckwith 2018*a*.
[17] Szemerényi 1980; Henkelman and Stolper 2009.
[18] Beckwith 2009.
[19] Taylor 1989.
[20] Caspari *et al.* 2017 are comfortable labelling the 10th–9th century BC burial complex at Tunnug 1 'Scythian'; cf. Chugunov *et al.* 2010 for Arzhan-2.
[21] Beckwith 2009: 377–78.

suggestive of a certain sort of power structure similar to that among the Mongols, in which elder sons fission and form alliances and rivalries while the 'king' retains the 'homeland' region and reserves the possibility of choosing fresh, politically uncompromised and (presumably) more obedient and malleable progeny to ultimately secure the succession.

A particularly salient point of interest for Scythia and the Scythians is the issue of slavery, and thus what kind(s) of social hierarchy existed in Scythia. In his Malay novel, *Lord Jim*, Joseph Conrad has his 'outsider' narrator, Marlow, describe the old wife of the local leader, Doramin: 'She was constantly in movement, scolding busily and ordering unceasingly a troop of young women with clear brown faces and big grave eyes, her daughters, her servants, her slave-girls. You know how it is in these households: it's generally impossible to tell the difference'.[22] Herodotus too, was an outsider, trying to make sense in Greek terms of social structures observed and reported. So when we review the historical and archaeological evidence we have for non-state level Eurasian Iron Age societies we find that starkly different conclusions are possible in relation to the exploitation of people and the degree to which they were caught up in the chattel slavery of the classical world. The presence of an underclass who may typically not be accorded any formal death rites, and who may only appear from time to time – and often ambiguously – in iconographies, means that slavery presents very particular problems if we attempt to infer it from material cultural or skeletal remains. Argument has therefore to be rather tangential, based on such things as the presence (for example) of ritually killed individuals ('wives', 'retainers' 'concubines', 'servants') in major high-status burial complexes ('Royal Tombs'); or unfree labour, simply on the basis of the scale of standing monuments (such as the 33 km of 10 m high earthen ramparts at the super-oppidum of Belsk).

But arguing for the existence of a labour class does not define its type; and while one of us has argued for a 'maximalist' definition both of slavery as a category and of its percentage presence in Iron Age societies,[23] another of us has argued that commentators like Herodotus, looking in on the steppe formations, quite naturally misunderstood as slavery what was in fact a political, feudal-hierarchical *comitatus* system of oath-based service.[24] Despite genuine open questions, there are ways to accommodate these apparently opposed conclusions (without simply saying that the evidence is underdetermined, which indeed remains true). We can do this if we allow ourselves to understand the Iron Age steppe in imperial terms, with many systems both present and absent, fading, emergent, expediently adopted, and mutable. In short it is quite possible that a *comitatus* form characterized the internal (and ideal) dynamics of elite-level formations, while the interplay of sedentary agriculturalists, traders, service ethnies, and opportunistic traders within contact settings continually brought certain kinds of people into the ambit of chattel slavery, with its attendant cultural disembedding.

Three statements or passages in Herodotus are of particular interest, one where he says that 'the king has no bought slaves'; another where he explains that all Scythian slaves are blinded who work with horses in the pastoral economy; and a third where he tries to explain the identity of the Amazons. The first statement can be seen as consistent with the elite levels relying on oath-sworn retainers. The second does not actually have to imply chattel slaves fitted for export. Thus we may have evidence for a class of feudal retainers closer to the centres of power, or within court settings, and a class of brutally exploited forced labour captives also not within a market system. Both classes may have been tangibly separate from export market slaves – those slaves described as 'Scythians' in (for example) Athenian property documents relating to the liquidation of assets.

In respect of the second, potentially problematic, statement on systematic blinding ('all slaves', but presumably in the specified context Herodotus was thinking of) one can note, along with Blakesley,[25] that it would make sense insofar as one can appreciate how a system of merely branding would not have effectively stopped people absconding on horseback. Other explanations are possible, short of rejecting the information as fantasy (for example, there may have been biomechanical or zoonotic factors at play in this close-up work with horses that meant that eventual blindness was an almost inevitable occupational hazard). However, beyond remaining obscurities, the statement may serve to convey to Herodotus's listeners one of the potential freedoms of the open steppe (albeit under a negative sign), as we know that for people at the lower ends of sedentary societies such as the Chinese Empire and the Roman Empire – for both of which we have fairly good, explicit historical accounts – there was a powerful drive to escape a horrific sedentary existence for the relative freedom and well-being of central Eurasian societies such as the Hsiung-nu (eastern Scythians) and (later) the Huns.[26]

The third passage is too complex to discuss in detail here, and has been the subject of in-depth treatment elsewhere (along with a comparable but significantly

[22] Conrad 1993: 160.
[23] Taylor 2001; 2010.
[24] Beckwith 1984; 2009.
[25] Blakesley 1854: 437, fn. 9; Taylor 2001.
[26] Beckwith 2009.

different passage in the Hippocratic Corpus).[27] The ostensible theme is a Greek slaving expedition to the Sea of Azov that went wrong, but it is actually a vehicle for an origin story where Herodotus explains to his audience why warrior women exist among the Sauromatae, a Scythian-dialect-speaking martial nomadic people east of the Don (genealogically linked to the Sarmatians of the late 1st millennium BC). What is important here is that – very briefly put – the slave raid set-up for the origins tale may well imply something about the emergence of an interest group among females within higher social circles on the steppe, who were progressively excluded from a burgeoning slave trade that their brothers were using for benefit and aggrandizement. Taylor argues that these women were choosing, at least by the 5th century BC, to adopt a more active raiding role for themselves, so as to cut themselves back in to the paths to power that a contact situation had genderally skewed.[28] Whether or not this argument has value is of less importance here than accepting that the expansion of Greek interest – the *sine qua non* of all the information Herodotus and other authors provide concerning the steppe at this time – was altering the economic and social dynamics of the steppe even as the colonists tried to describe it.

Materiality and culture

The presence of material items commonly identified as Scythian (i.e. what is often termed 'Scythian material culture') far beyond the steppe is often taken to imply either ethnic presence or influence outside the pastoral nomadic context. There is a certain asymmetry in this, as the widespread appearance of items of Greek material culture in Scythia is not concomitantly seen as indicating the presence of Greeks inland from the Pontic coast. There is a tacit assumption that while Scythians would be thrilled (and somehow civilised) by being able to consume Greek culture, Greeks would be reduced by adopting and consuming things Scythian; it would follow that Scythian items beyond the steppe belonged to people who were Scythian, and Greek items within the steppe zone ditto. Whether this was typically the case, it is also certainly an assumption based on a traditional reading of Scythians as barbarian, wild, and able to benefit from 'higher' culture, and is thus part of the nexus of implicit understandings that we are bringing into question here.

However, findings of virtually identical 'steppic' assemblages, wherein the iconographic animal style appears embedded in a signature combination with other material categories, forming the 'Scythian Triad' considered diagnostic of the archaeological complex, do mostly correlate locationally with a steppe context. The focus on this correlation has led to the archaeological phenomenon being reduced to a bare material category. Since it is found otherwise in variable contexts of geography, race, gender, etc., it has ended up being viewed as something of an epiphenomenon to the pastoral nomadic lifeway, that is, as the direct result of 1st millennium BC economic adaptations to the steppe environment. The general idea is that of a cultural continuum, where the adherence to a lifeway in response to ecological requirements led to a commonly shared material culture.[29]

This *sensu lato* 'Scythian continuum' idea – decoupled from Herodotus's west-of-the-Don-plus-émigré-Royal-Scythians model – does not, at first glance, necessarily seem problematic. While the concept cannot fully explain the term *Scythian*, or otherwise illuminate the identities of the nomads sharing this material culture, it provides a category for the classification of material culture in archaeology without the need for further interpretation in terms of, for example, ethnic attributions of said material.

However, what sounds pragmatic has brought problems with it. For one, the adaptive interpretation of material culture has generally encouraged the popularity of a view that the nomads were not connected beyond their common lifestyle and economy. The broad acceptance of a view that pegs them as quasi tribal societies lacking more complex structures has led to what we argue here is the sweeping underestimation of the power and influence of the nomadic phenomenon and its fundamentally *political*, feudal structure, as plausibly described by Vladimirtsov.[30] The traditional simplistic understanding also decouples archaeology from most reasonable understandings of history, at least in the west: for example, it is simply unimaginable, unless Herodotus completely misrepresents the scale and nature of Darius's campaign of 513 BC, that the Achaemenid Empire would have mounted a full-scale military expedition, risking a catastrophic failure, against a few disorderly bands of mounted raiders. The pivotal position of the Scythians within Eurasia, as discussed in this paper, is surely what attracted Darius; he found out about their power by failing to conquer them.

Another problem is representativity: the archaeological assemblage is understood as the direct representation of the economic phenomenon, but while it is (necessarily?) connected to it, the phenomenon it represents in the context of burial is clearly not economic, but rather socio-political/religious in nature.

The general underestimation of the Scythian phenomenon is a direct result of its reduction to a

[27] Cf. Taylor 2010.
[28] Taylor 2010.
[29] Khazanov 1994; 2015; Di Cosmo 2002.
[30] Vladimirtsov 1934.

largely economic phenomenon shared loosely (if at all) by 'marauding tribes'. It encompasses, for example, the old misunderstanding of the steppes as a cultural ('barbarian') vacuum or barrier of sorts, which prevented 'civilised' powers on the steppe periphery (such as Greece, Persia and China) being in contact with each other (thus deepening the enigma of their often apparently 'in-step' development, famously problematised by the existentialist philosopher Karl Jaspers in an article identifying a so-called 'axial' age in world history).[31] But it also applies in cases where steppe nomads are acknowledged as an important phenomenon, such as in Braudel's conception of them as catalysts of rapid change in slow historical processes;[32] or, more recently, in Turchin's theory of imperiogenesis being spurred on by pressure from militarily dominant steppe peoples.[33] Even there, the steppes and their inhabitants get reduced to an amorphous factor in the development of peripheral agrarian states. Most current theoretical models of social complexity, cultural evolution, or state formation are unable to account for mobile formations, and the way in which coding appears to function in comparative big data systems, such as those developing out of Murdock's Human Relations Area Files (HRAF), essentially require a spatial boundary definition for individual polity units, of a kind that cannot accommodate the realities of a massive, distributed, mobile, and elaborately hierarchized social complex.

Modern work by specialists in central Eurasian languages and history regularly refers to nomadic political formations as 'states', especially the large empires formed by them in the steppe zone.[34] However, among archaeologists, anthropologists, and others trained primarily by discipline rather than by specialized area, language, nation, etc., nomadic 'states' have long not been conceptualised as such, instead being referred to as 'tribal confederacies' and the like; only in response to a strong agrarian (and 'civilised') state are they seen as able to form complex political organisation. A well-known example is Barfield's 'shadow empires',[35] which sees a kind of copy reflex at work, that in actual chronological terms simply could not have been there. The shadowing is wholly undermined by the fact that every historically well-known steppe empire was already formed before the appearance of the neighbouring sedentary empire purported to have inspired it. Barfield's theory may be thought of as tending towards ahistoricity, the result of following theoretical models of what a 'state' signifies that are founded on conceptions of strictly sedentary and agrarian polities; nomadic states accordingly do not fit their mould. The difficulty with the fit to prior expectations means that mobile states are often left out of any attempts at synthesising comprehensive models. Only recently have there been attempts at reframing the definition of 'state' in a way that it is able to accommodate mobile cores and different subsistence models.[36]

The 'marauding tribes' narrative is also contradicted by the archaeological record. The majority of Scythic finds are in the funerary context, and clearly represent an elite stratum; the assumption that these sites reflect the entire breadth of Scythian society or Scythian life can thus be discarded. Nor are the very lavish burials spectacular outliers: from an archaeological perspective, wealth (insofar as it is an objective criterion) is one of the key characteristics of this phenomenon. For an accurate assessment of the Scythian phenomenon we need to ask what the archaeological record really represents, since it seems not to be identifiable directly with the 'nomadic lifestyle'.

The immensely rich archaeological sites we attribute to Scythian nomads point to a much more complex and stratified society; at the same time, they can catch us up in a self-fulfilling reflexivity. On the one hand, we have the evidence of burials like Ulski Aul, with vast numbers of animals ritually slain during the construction of a single paramount chief's kurgan – the original excavator, Veselovsky, gave up counting when he reached 360, and that was just the horses (plausibly strangled as Herodotus describes), stalled in regular arrangement, in just one level of the kurgan.[37] On the other hand, the very nature of these spectacular sites has meant that (until recently at least) there has not been the archaeological capacity to extend beyond such 'hot spot' monuments, to investigate landscapes and document the more fugitive remains of sedentary agriculturalist, service ethnie, and transhumant (but not nomadic or elite) pastoralist lifeways and formations that could (should) have been part of the weave of a complex imperial organism.

Put another way, the modern 'Past As Wished For' is able to accommodate a simplification of this kind, trading a highly complex if incomplete spatio-temporal understanding of past dynamics for an ethnically united 'Scythian' past, where the apparent disjunct between the martial nomadic *Gestalt* and the extraordinarily impressive burial monuments tends to promote the greater wonder and glory of the whole, at the expense of what Eric Wolf called 'those without history'.[38]

[31] Jaspers 1949.
[32] Braudel 1971.
[33] Turchin 2009.
[34] See Beckwith 2009 for discussion.
[35] Barfield 1993.
[36] See for example Honeychurch 2013; 2014.
[37] Taylor 1994, reproducing the drawing of the original *in situ* discovery.
[38] Wolf 1982.

Those who did have history – being visible in Herodotus's *History* – also had spectacularly high-visibility material practices, which must have impressed contemporary witnesses in much the same way that they still impress the museum-going public. But how that material visibility was generated and why presents a problem. Considering the means and motivation of those responsible for the gleaming gold interred in kurgan complexes, such as at Chertomlyk, one of us has pondered 'Precisely how they managed to get Greek colonial craftspeople to make fabulous jewellery for them which, uniquely among all the apparent arts of empire, aggrandises the "barbarian", remains unclear'.[39] In scholarly hindsight, one should perhaps no longer use the word 'barbarian', even with scare quotes, as has been argued at length.[40] We need to simply accept that the Scythian social formation by the 5th and 4th centuries BC represented something far more militarily, and even politically, powerful than all the Greek city states put together; and that it had personages who could pay for better goldsmiths, more often, and consume their output more conspicuously, than pretty much anyone in the Aegaeo-Mediterranean world (even taking the filters on archaeological survival into account).

For understandable reasons of formal classification, a distinction has been drawn between *Scythian* art – implied to be an indigenous, animal style – and *Graeco-Scythian* art, aesthetically closer to classical conventions but depicting the Scythians themselves, along with certain of those animals that their 'own' art forefronted. Thus the indigenous zoomorphic imagery is generally seen as a 'tribal' and totemic art form, depicting shamanistic practices and exhibiting beliefs that are often seen as innate to nomadic societies, while the Graeco-Scythian material is seen as something of an ostentatious perversion of classical themes, largely serving to express wealth and power through its excess (one might think of the Tovsta Mogila/Tolstaya Mogila pectoral or the Chertomlyk amphora rhyton). At the eastern end of the steppes, similar distinctions are made between objects with a clear continuity in iconographic content and craftsmanship to other objects throughout the steppe, and objects that reference the style while otherwise exhibiting more traditionally 'Chinese' artistic values and crafts; the latter are very often interpreted as a display of exoticist trends among Chinese nobles. *Mutatis mutandis*, when Scythian archaeological content is found outside the usual steppe context, the interpretation is usually either that it is evidence of trade, or that artists in the recipient society were 'inspired' by steppe design, as if this was a purely aesthetic choice. Recent art historical work, however, increasingly tends towards interpreting the referencing and even copying of steppe style as a sign of respect, or even attempt at emulation.[41]

Andreeva has recently described the 'Animal Style' art as a 'visual language, intelligible to a small nucleus of elites';[42] a language complete with idioms and tropes, fluency in which was key to socio-political status. For Andreeva, the entire burial represented a visual system constructed for a selected audience (both real and imagined); but this approach tends to stress the nativist and slightly mythic or timeless nature of the funeral rites, without regard to the organisation, elaboration and renewal of what has to be understood, from its scale and systematics, to have been a state religion. The proximal purpose of the elaborate rites – which after all could accommodate many material innovations such as the presence of exotica (i.e. non animal style nativist 'art') – was to attest the belief of the ruling class of people and their immediate retinues and cohorts in Heavenly God.[43] This is a classic characteristic of central Eurasian steppe peoples, including the early Turks and Tibetans;[44] the distal purpose(s), by which we mean the reasons that were perhaps not expressed explicitly, had to do with tribute-maintenance, succession, inter-factional and generational competition, and social control through a demonstration of lethal ritual power. In this sense, Scythian elite burials conformed perfectly with Robert Hertz's insights into the scale of death rites.[45] In short here, we assert that the entire funerary assemblage is an expression of 'Scythian' ideas: ideas about themselves and in particular about how to express this identity for burial and its proximal and distal purposes – the successful launch into an afterlife, and the use of that construction, and the practices attendant on it, for reasons of social reproduction (practically managing an ultimogeniture system of succession, for example).

From an archaeological perspective, this must be the core of the 'Scythian phenomenon', yet working definitions of 'Scythian' are often rather more simplified, and content-poor. For example, the conjunction of animal-style art with distinctive sets of both horse harness and weaponry, is often considered to constitute the so-called 'Scythian Triad',[46] which is often used as a diagnostic marker for the archaeological phenomenon and thus for the economic phenomenon of an emergent, presumed, pastoral nomadic lifestyle. This interpretation might suggest itself where it concerns the horse, horse-riding, and horse-herding – which, after all, was the entire basis of the lifestyle – and maybe also where it concerns some of the martial

[39] Taylor 2003*b*: 413.
[40] Beckwith 2009: 320–62.
[41] E.g., Kost 2017.
[42] Andreeva 2018.
[43] Khazanov 2016.
[44] Beckwith 1984; 2010.
[45] See Taylor 2003*a*: 125–35 for Royal Scythian funerary rites; also Taylor 2011 on the relevance of Hertz and van Gennep.
[46] E.g., Kuzmina 2007: 402.

aspects (such as the Scythian short sword, *akinakes*, or the Scythian *gorytus* or combination quiver / bowcase, both developed for cavalry), but it becomes much more complicated where it concerns the animal style art. At least two problems exist with the 'Scythian Triad'. Firstly, as a definition it has little direct social-political-religious content; secondly, and more problematically for a diagnostic tool, it is highly reductive concerning the characteristics we are obliged to consider 'typical' for nomadic sites. It thus is not an accurate representation of salient archaeological phenomena as a whole; the underground and overground architecture and construction rules (and indeed the measurement system) used in kurgan construction could be argued to be equally diagnostic for Scythians.

However, by focusing on the 'Triad', more or less illusory problems present themselves for solution: if the combination is deliberate, for example, then to what end, exactly? An interpretation that has been ventured before is that the assemblage acquired 'magical properties' when put together for burial purposes, insofar as it granted the deceased access to 'heaven'.[47] But if we acknowledge that the 'Scythian Triad' is an insufficient tool for identifying and interpreting 'Scythic' sites, we might need to include other 'typical' elements of archaeological complexes in the analysis. When looking at the concepts that the constituent parts of the assemblage are supposed to have represented, especially in the funerary context, several come to the fore. Expression of wealth is one of them, obvious from the amount of gold, jewellery and rare prestige objects, as well as the sometimes-conspicuous economic cost displayed by the size of tumuli or the extent of animal or human co-burial.

The mention of co-burial, and the earlier indication that we do not use the term 'sacrifice' for the ritual killing of animals or humans (at least for most funerary contexts) leads to the key question of social form on the steppe, among the Scythians *sensu stricto* and the peoples they (whoever 'they' were at any one time or place) controlled, protected, exploited, and/or coexisted with. If we turn first to the heart of the Scythian elite formation, it is clear from historical sources, both earlier and later, as from the iconography, and supported by some finds, that the Scythian 'glue' was the sworn blood oath. Herodotus discusses this, and the use of cups made from human calvaria in such settings; archaeologically, that such artefacts existed is supported by finds from Shramko's excavations.[48] The oath system was the basis for the creation of the *comitatus* in central Eurasia – a system that permeated all known central Eurasian cultures at least as late as the end of the 1st millennium AD,[49] and is attested down almost to modern times in some cultures. The *comitatus* can be generally agreed to have existed among the Scythians, and is described by Herodotus, so that the ritualised deaths (whether through execution or belief-led suicide) and co-burial of the *comitatus* warriors of a deceased lord, were *not* 'sacrifice' but part of a central Eurasian feudal hierarchical structure that was not often well understood by outside observers, who translated it into terms of what they knew from their own cultures, especially the relation to slavery (historical evidence indicates that comitatus warriors had to be nobles, so those who died in these special settings were not slaves). The *comitatus* (along with mounted archer-warriors and massive burial mounds) was adopted from Koguryo and other central Eurasian cultures by Japanese warriors fighting in the Korean peninsula; when they returned home, they introduced it to Japan, where it continued to be practised down to early modern times.[50] In cases witnessed by T'ang Chinese, the *comitatus* warriors were described as *eager* to commit suicide to carry through with their oaths, which were not restricted to life on earth,[51] and this is echoed by the Herodotean description of Thracian wives vying to be the 'favourite' who would die with her lord in chiefly funerary rites. Although the level of psychological commitment, belief, compliance, and/or coercion have, of course, to be carefully considered, probably on a case-by-case basis,[52] the fact of the *comitatus* system as the ideal and structuring one should be accepted (albeit allowing for other relations of dependence further down the social scale).

It was not, of course, a timeless mode, and if we want to trace its origins then we have only archaeology to go on. There is no space here to elaborate a possible argument convincingly, but one might look to the emergence of the Seima–Turbino transcultural phenomenon at the end of the 3rd millennium BC, and the emergence around 2000 BC of distinctive, competitive, elite, chariot-owning cultures on the steppe ('a class of military elites characterized by aggrandising behaviour'),[53] which both elevated the horse to cult status and was part of new, broadly synchronic, interregional contact possibilities, where allegiances were maintained not within a space (a particular physical court, for example) but across space. A sworn oath system could thus allow hierarchy to exist among those who could not, due to their mode of life and economic interests, occupy the same spaces at the same times.

This system, with its prior phases (Seima–Turbino/Andronovo, followed by Thraco-Cimmerian/catacomb)

[47] Yablonsky 2000; Beckwith 2010.

[48] See Taylor 2003*b*; see also Taylor 1994 for a brief discussion of parallels with the later Mongolian practice of 'anda'; for population analysis at Belsk see now Ventresca Miller *et al.* 2019.

[49] Beckwith 1984; 2009: 12–23.

[50] Farris 1996.

[51] Beckwith 2009.

[52] Beckwith 2009; cf. Taylor 2003*a*: 86–112.

[53] Chechushkov and Epimakhov 2018: 435.

led to the formation or system we focus on here, 'the Scythians', which had an ethnic and religious ideology at its heart but was just the most visible node (archaeologically as textually) in a steppe world-system that integrated ecozones from northern taiga, south via the natural resource-rich forest and forest-steppe belts to the maritime, montane and desertified barriers south of the grassland steppe proper (cf Rawson *et al.* 2020 for a detailed treatment of pre-Scythian technological and military innovations into and out of China's steppic interface, 'the Arc'). The map shows this zonation, as well as the west to east extent of the grassland belt which the Scythians dominated and (in part) ruled directly (Figure 1). This extends from the Danube to the Yellow River at least. It also extends southward into the area of Media, and likewise into the area called in pre-Han Chinese texts Ta-hsia (大夏 Daxia), centred on the east side of the great northern bend of the Yellow River.

The ideology represented by the Scythian material culture was the crucial factor that unified these early nomads beyond their economy or lifestyle. One key

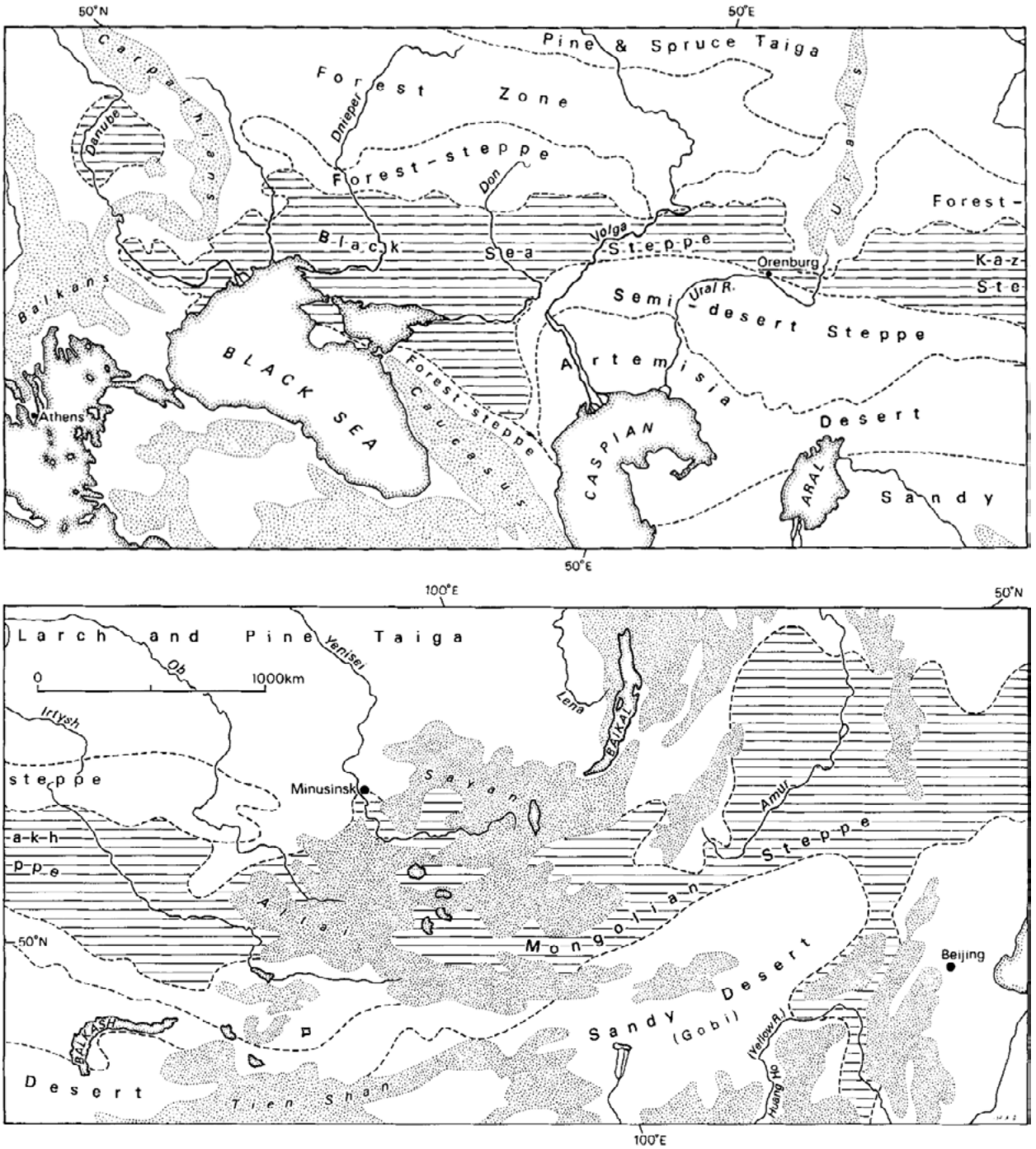

Figure 1. The Eurasian steppe zone from west to east
(drawn by T. Taylor, reproduced from Masson and Taylor 1989)

idea, common to most central Eurasian complexes, was that of belonging to an elite, which ruled by divine appointment; connected to that was the ideal of the one true ruler, who must be served loyally by his *comitatus* warriors (usually called the lord's 'friends') in order for them all to attain the afterlife.[54]

The world of Scythian ideas, representing a unified realm justly ruled over by one designated ruler, must have proved compelling as a model for legitimisation of power and for conquests and expansionist endeavours to other elites across Eurasia. This is attested by its continuation in two regions affected by Scythian rule: Media, the first Iranian empire, and Chao (趙 Zhao), a kingdom of the Chinese Warring States Period (*c.* 475–221 BC).[55] Scythians (as per the above definition) expanded across the steppe zone and into both these regions, which they then dominated or ruled directly. In both cases the non-Scythian locals (Medes and proto-Chinese) 'became' Scythians, or at least very heavily Scythianised, to the extent that at least some of them became bilingual in Scythian and their own language. Both Herodotus and the Chinese historian Ssu-ma Ch'ien tell us this in their own way, through several conflicting stories mixed together. Significantly, both ancient historians switched things around, pretending that their chosen local (non-Scythian) culture hero-king brilliantly invented or chose to 'adopt' this or that Scythian cultural element.[56]

The process by which the Scythian style of rulership was transferred to the Median empire, and later even further, to the Achaemenids, is described in detail by Vogelsang.[57] As he notes, the Scythians' style of rulership appears to have been well-suited to the governing of large, diverse polities, such as the later Achaemenids. The secret to their success and stability seems to have been not exerting that much 'control' after all; what mattered to them was their subjects' submission, by delivery of tokens, to their hegemony. Vogelsang argues that this style of governing was directly taken over from the Scythian elites formerly governing large parts of the Persian realm. It was transmitted by Scythic and Median Persian elites forming a new ruling elite, with Scythic ideas about how to rule and how to legitimise rule firmly engrained. Later on, Cyrus II, who was the son of a princess of Media, carried them into the Achaemenid empire. For the Scythian core elite, the Royal Scythians, who may well have had a sumptuary code that meant they drank only from gold (which is plausibly what Herodotus meant), their view of themselves as the chosen rulers of the world, and of everyone else as their subjects who submitted and paid tribute to them, meant that their empire could become vast even with only minimal institutional government.

Archaeological and art historical connections between areas under Scythian influence, such as the Achaemenid empire and the early Chinese realm, have been noted.[58] A creolisation of elites, similar to that which happened in the early Persian empires, may also have occurred in the kingdom of Chao, as noted above. A recent linguistic study has found that the capital of the Median empire (*Ecbatana* or *Agbatana* in Greek, *Agamatana* in Akkadian), now Hamadan, had two counterparts with the same name at the other end of the steppe: Handan, the capital of the kingdom of Chao (Zhao), and Hsien-yang (Xianyang), one of the capitals of the kingdom of Ch'in (Qin); the reconstructions of which names are identical to the Akkadian transcription of the name.[59] The Warring States rival Chao developed out of a split of the previous kingdom Chin (Jin); a major part of its territory centred on the east side of the great northern bend of the Yellow River, an area called Ta-hsia in pre-Han Chinese texts; formerly firmly steppe nomadic territory, it also lay directly across from the Ordos, the region inside the great northern bend of the river, which in Antiquity was counted among the best pastureland in the eastern steppe and continued to be the territory of nomads well into the Han dynasty. This is also where the historical kingdom of the Hsiung-nu first appears. Archaeologically, the region offers an abundance of 'steppic' sites and assemblages.

In the Chinese historical tradition, King Wuling of Chao (Zhao) was the first in China to introduce cavalry warfare; he also made his officials and courtiers wear 'nomad clothing'. The historical record here seems anecdotal, yet horseback riding is widely accepted as having been a direct adoption from the steppe people. Incidentally, in the same period, elite burials in China start to be marked with large mounds,[60] with the first and most famous mounds to be found on Chao territory (the so-called 'gravemounds of the kings of Chao'). It is possible that a hybridisation of elite cultures is reflected in these archaeological remains, but further study is needed, pending complete excavation of the sites.

The second 'Ecbatana' in early China, Xianyang, was the seat of rule of the man who would go on to become Ch'in Shih huang ti (Qin Shih-huang-ti), the first Chinese emperor. He was born in Handan, the son of a prince of Chao (*Shih chi* chüan 6). Most surviving Chinese historical works on the Ch'in are heavily prejudiced against the Dynasty's founder, so in them the prince's mother is described as a 'dancing girl' who had belonged to a merchant-politician. Ordinarily, this would be bad

[54] Beckwith 1984; 2009: 1–23; 2010.
[55] Beckwith forthcoming.
[56] Beckwith forthcoming.
[57] Vogelsang 1992: 243.
[58] E.g., Bunker 1993; Wong 2017.
[59] Beckwith 2018*b*.
[60] Jacobson 1985.

for a ruler's biography, but she was solidly a member of Chao's eponymous ruling clan, and undoubtedly of royal lineage too. Ch'in Shih huang ti was raised in Handan before going to Hsien-yang to take the throne as king of Ch'in. Like Cyrus II, he later returns to his country of birth to conquer it and styles himself emperor of a new dynasty. The political and administrative reforms he implemented after his forceful unification of the Chinese realm and the foundation of the first Chinese empire were so revolutionary that they remained in place largely unchanged for the entire duration of Chinese imperial history.[61]

The current state of research on the 1st millennium BC steppe, as the 2017/18 British Museum exhibition clearly demonstrated, has moved us on significantly from the vacuum of wild barbarity envisioned by Jaspers as blocking communication between the civilisations of east and west, and thereby rendering their parallel developments almost mystical. If we are right, the axial age had an axis. The Scythian royal court was not just the managerial apex and consuming heart of an empire, but a place with a state religion and defendable ideology, aware of outside worlds and able to bridge them, materially and intellectually.

Acknowledgements

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[61] As first pointed out by Miyazaki 1977/78.

Antennae of Scythian *akinakai*: from abstraction to realism, there and back again

Denis Topal[1]

Abstract

The unusual antenna design of the pommels of the *akinakai* drew the attention of researchers of Scythian blade weaponry relatively early. They appear in the second half of the 7th century BC but, during this early Scythian period, the antenna pommel is more of an experimental exception than a formal tradition. They become more widespread at the end of the middle Scythian period. The appearance of ornithomorphic and zoomorphic pommels fit within the framework of a common Eurasian tradition, for instance of griffin daggers. Over time, a typological series of antenna pommels in the form of heads of birds of prey, beginning with large realistic forms and gradually evolving towards minimisation and abstraction, possibly connected with the loss of the original image.

Keywords: Antenna pommel; Scythian culture; Eurasian nomads; Iron Age; *akinakes*; *akinakai*; griffin-dagger

Antennae traditions in Scythian milieu: in a search of the prototype

> 'You know what to beautify is, I suppose?' 'Yes', said Alice, doubtfully: 'it means to make anything prettier'. 'Well then', the Gryphon went on, 'if you don't know what to uglify is, you are a simpleton'.[2]

The unusual design of the pommels of *akinakai* in the form of antennae or volutes attracted the attention of researchers of Scythian blade weaponry relatively early, and the pommel shape lies at the basis of almost all known classification schemes of Scythian swords and daggers.[3] As regards the origin of the antenna pommel in the Scythian milieu, E. Lenz,[4] E. Minns,[5] M.I. Rostovtseff[6] and W. Ginters[7] drew attention to the remarkable similarity of this type of decoration on the *akinakai* with those made in the late Bronze Age and Hallstatt periods in central Europe. M.I. Rostovtseff, for example, imagined the emergence of the antenna hilt to be the possible result of a combination of 'western' (Hallstattian?) and 'eastern Animal Style' forms.[8] W. Ginters considered the antenna pommel of the Scythian sword to be a later phenomenon in comparison with other types of the pommel.[9] He noted that the *akinakai* with antenna pommels co-exist with the straight and oval types in the later phases and they often have a similar hilt design. However, unlike M.I. Rostovtseff, W. Ginters was more cautious about the idea of a Hallstattian origin for the Scythian antennae and noted that there was no evidence to prove influence of Hallstatt and La Tène swords on Scythian *akinakai*.[10] A.I. Melyukova,[11] followed by B.A. Shramko,[12] insisted on the local appearance of the antennae design of the Scythian pommel and made no reference to the Hallstattian traditions.

A. Vulpe suggested that the antenna pommel was an innovation of the local population of the Carpathian-Danube region which was formed under the influence of 'central European antennae daggers' ('mitteleuropäische Antennendolche'), which then spread eastward into the Scythian world.[13] Later, he reiterated this and explained the lack of reliable information about earlier *akinakai* with an antenna in the northern Black Sea coast.[14] Indeed, the eastern influences on central European technologies are virtually discounted by most scholars,[15] and the principal tradition in metalworking of the Carpathian Basin since HaA_1 is of western middle Danube origin.[16] Moreover, the antenna pommel is a rather late phenomenon for the central European daggers themselves, and is fixed no earlier than HaB.[17] For the HaB_1 period there are only seven examples.[18] The

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[2] Lewis Carroll, *Alice's Adventures in Wonderland.*
[3] Rostovtseff 1918: 57; Ginters 1928: 40; Melyukova 1964: 53–56; Vulpe 1990: 22–62; Alekseev 1991: 276.
[4] Lenz 1905: 62.
[5] Minns 1913: 70.
[6] Rostovtseff 1918: 58.
[7] Ginters 1928: 40.
[8] Rostovtseff 1918: 60.
[9] Ginters 1928: 44–45.
[10] Ginters 1928: 90.
[11] Melyukova 1964: 60.
[12] Shramko 1984: 33.
[13] Vulpe 1967: 61.
[14] Vulpe 1990: 52–53.
[15] Sievers 1982: 10.
[16] Dergachev 1997: 57.
[17] Sprockhoff 1934: 34, 71; Müller-Karpe 1961: 53–55, 57, 65, 88.
[18] Stockhammer 2004: 68.

majority of the dated items instead belong to HaB_3 and are mainly distributed in eastern Germany and Poland. The situation changes in HaC but the distribution extends westwards and southwards as far as the eastern Alps and central Italy.[19]

If we look at the pre-Scythian horizon, we can see a total absence of antenna pommels among Chernogorovka-Novocherkassk swords and daggers although there is a single dagger with an antenna pommel from the Koban culture of the central Caucasus which was designed in the form of opposing heads of predators,[20] but made no later than the 10th century BC.[21] Nevertheless, despite all attempts to present this Caucasian/Iranian/Asiatic dagger as a precursor of Scythian *akinakai*, its unique character and chronological isolation do not allow it to be grouped with Scythian antiquities.[22] Moreover, the iconographic traditions of griffins are absent in the pre-Scythian horizon of the Eurasian steppes during the late 2nd and early 1st millennia BC.[23]

About a third of all European *akinakai* have antenna pommels. The distribution of antenna pommels of Scythian swords and daggers is fairly uniform, except perhaps in more remote regions, namely Transcaucasia to the south and the Great Hungarian Plain, Moravia and Silesia to the northwest. Chronologically, the antenna design of a pommel seems to appear not long after the emergence of the *akinakes* itself, while the wide distribution of this design falls in the second half and close of the 6th century BC. It is highly significant that representations of *akinakai* with antenna pommels appearing on monumental sculptures of the Scythians mainly belong to the 5th century BC, and date no earlier than the second half of the 6th century BC (Figure 1).[24] At the same time, most of these representations come from the area of the northern Black Sea coast along the right bank of the Dnieper river. Moreover, the ceremonial forms – i.e. those decorated with precious metals – are unknown before the 5th century BC.

It is unsurprising that the earliest funerary complexes containing Scythian *akinakai* with antenna pommels are associated with the three main regions: the northern Caucasus, Dnieper forest-steppe and the Carpathian-Danube. These cultural enclaves in fact became the origins for new forms of bladed weapons during the early Scythian period, particularly of the Gudermes[25] and Kelermes types.[26] Ambivalence in the pommel design was typical for *akinakai* from early Scythian times onwards as experiments with antenna pommels are clearly visible on Kelermes swords and daggers. Moreover, antennae are still unknown among the bimetallic *akinakai* of the Gudermes type, which appeared in the first half of the 7th century BC. The antennae are well-known on swords and daggers at the beginning of the middle Scythian period, but they dramatically increase in humber during the second half of the 6th century BC. In addition, antennae of this period begin to take shape in accordance with the canons of Scythian 'Animal Style' and in the realistic manner typical of that period.

'Beautifying' the pommel: zoomorphic pommels of Găiceana type

Scythian swords and daggers with 'Animal Style' antenna pommels from the Black Sea region were distinguished from swords with a simple antenna by A.I. Melyukova, who noted that the former are more characteristic of Scythia.[27] At the same time, swords with bird's head pommels were distinguished from those with 'claw' pommels, which were sub-divided into types with a butterfly-shaped hilt or a pseudo-triangular hilt. Among those *akinakai* which could not be classified like this, perhaps because of their realistic appearance, A.I. Melyukova – and later V.G. Petrenko – referred to swords from kurgan 401 near Zhurovka village, a chance find from Gamarnya village, and an undocumented artifact from the State Museum in Kiev.[28] The swords and daggers with zoomorphic pommels were also considered separately by A. Vulpe.[29] This Romanian archaeologist placed in his final typological group, *Formengruppe V*, the swords of 'Găiceana type' which were dated from the second half of the 6th to the first half of the 5th centuries BC.[30] In addition to the characteristic 'Animal Style' pommel, the *akinakai* of this type have a very distinctive semi-circular hilt which is likened to the shape of a 'Thracian shield' (πέλτη) by A. Vulpe (Figure 2).[31] The relative rarity of *akinakai* with a semi-circular pommel did not allow A.I. Melyukova, writing in the 1950s, to determine a reliable chronology.[32] However, since then, the evolution of this type of hilt was either placed within the 6th–5th centuries BC,[33] or purely 5th century BC.[34] As many as 55 examples of swords and daggers with semi-circular hilts were recently studied by Ukrainian scholars who stated that they dated more narrowly to the second half of the 6th and first half of the 5th centuries BC.[35] At the same time, it is noteworthy that *akinakai* with semi-

[19] Stockhammer 2004: 69.
[20] Curtis and Kruszyński 2002: 10–11, fig. 6, 110, pl. 2a.1.
[21] Kozenkova 2013: 97.
[22] Curtis and Kruszyński 2002: 11; Dudarev 2011: 225.
[23] Kantorovich 2010: 195.
[24] Olkhovsky and Yevdokimov 1994: 73, table 18.
[25] Topal 2015: 74.
[26] Topal and Bruyako 2012: 141.
[27] Melyukova 1964: 55.
[28] Petrenko 1967: 43.
[29] Vulpe 1990: 57–64.
[30] Vulpe 1990: 60.
[31] Vulpe 1990: 58.
[32] Melyukova 1964: 55.
[33] Fodor 1969: 253.
[34] Yevdokimov and Murzin 1984: 78.
[35] Babenko and Shelekhan 2015: 83, 88.

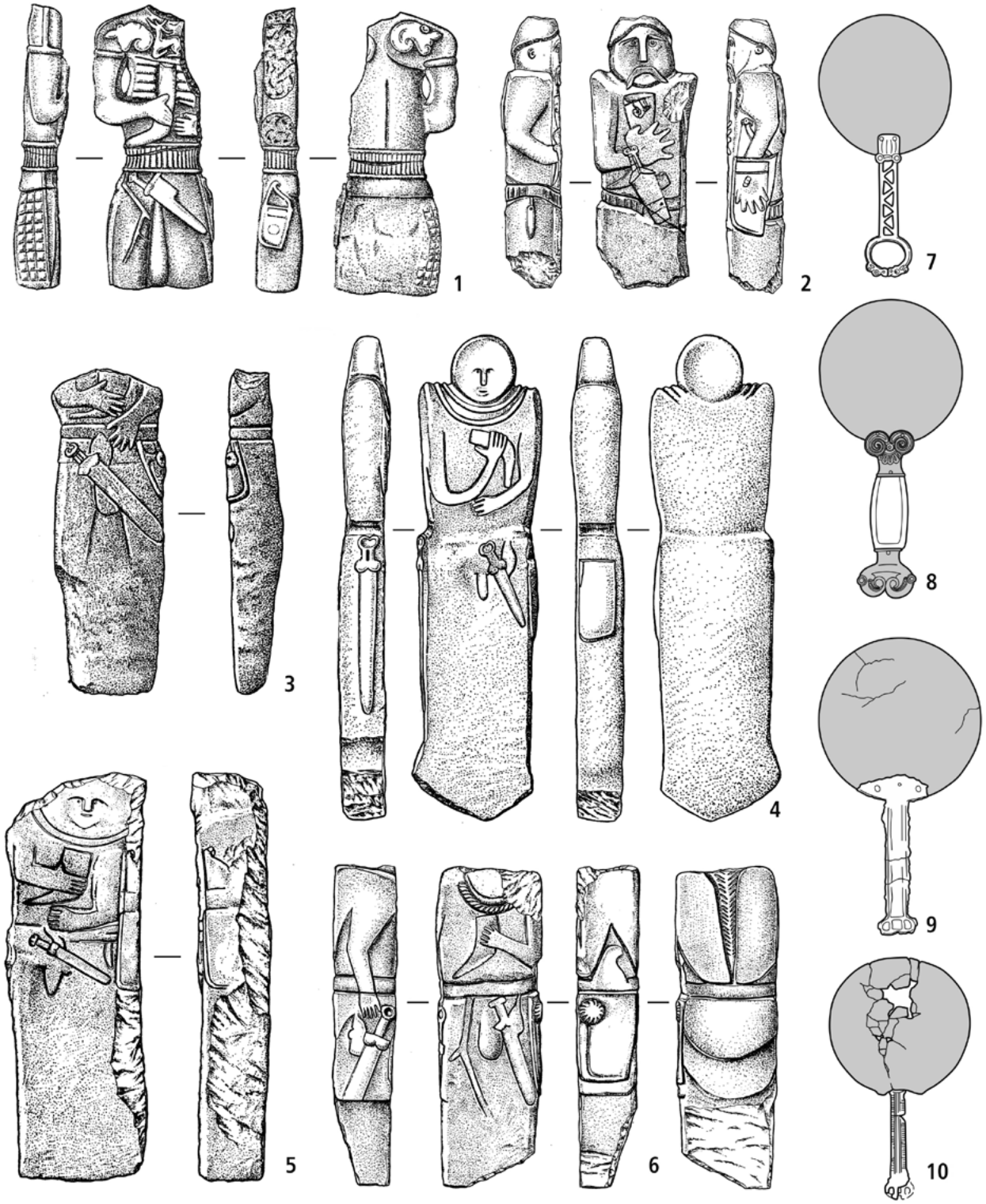

Figure 1. Antennae pommels on Scythian anthropomorphic sculpture (1–6) and mirrors (7–10): 1, Krasnodar Museum (Pregradnaya?); 2, Ternovka; 3, Pervomaysk; 4, Mederovo; 5, Lyubomirovka; 6, Kirovograd; 7, Podolye; 8, Basovka; 9, Chertomlyk; 10, Vishnopol

circular hilt found in burials are typical of the Black Sea steppe region and Crimea, while the chance finds mainly occur in the forest-steppe of the Donets-Bug interfluve and eastern Carpathians.[36] If we summarise the dating evidence for these Găiceana daggers, it transpires that the preliminary dating suggested by A. Vulpe is confirmed as the 'second half of the 6th– first half of the 5th century BC'.[37] We could lower this dating

[36] Babenko and Shelekhan 2015: 79–86.

[37] Vulpe 1990: 60.

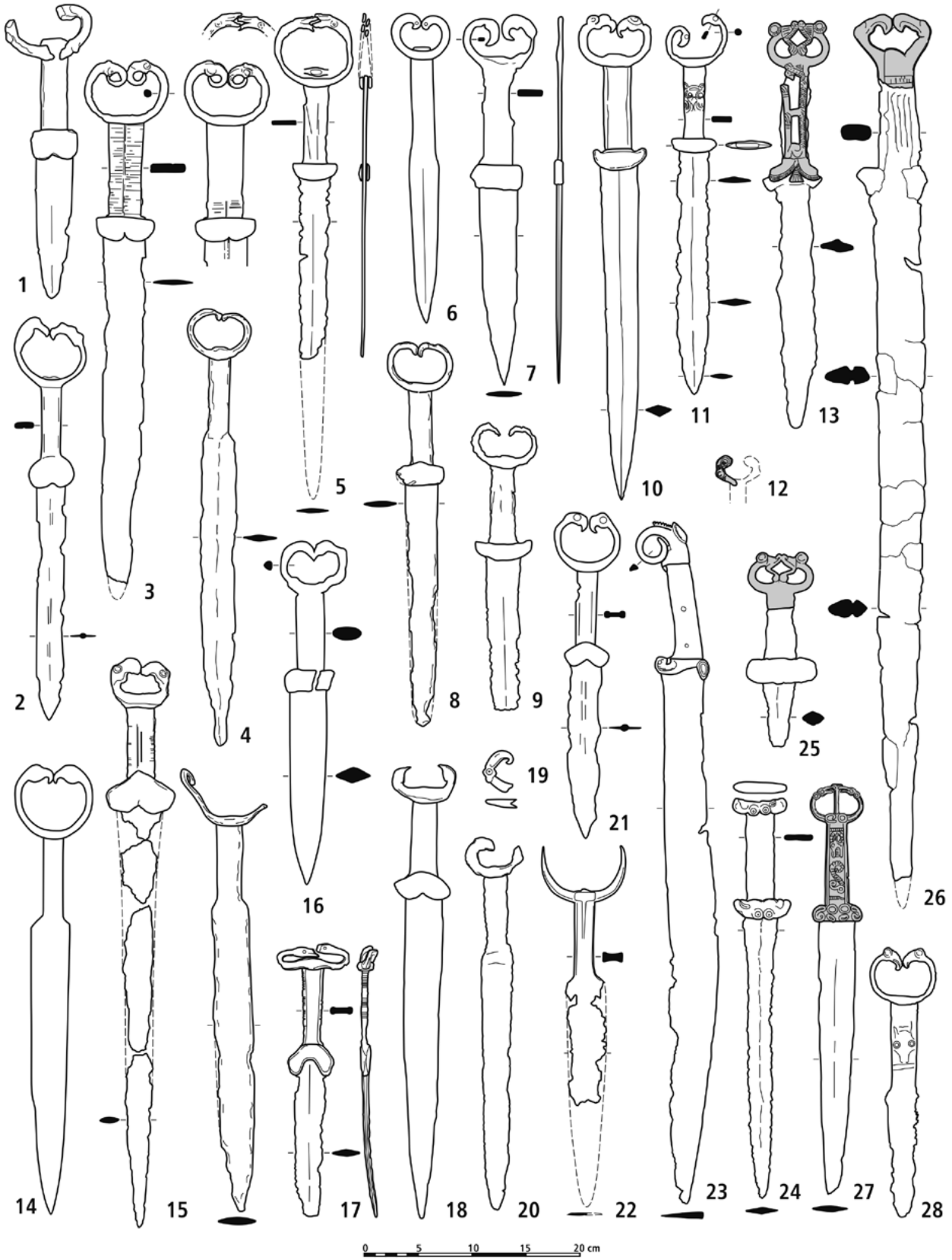

Figure 2. Găiceana type *akinakai* and related items (selected items): 1, Capaclia; 2, 17 Rassvet (gr. 29); 3, Cepari (b. 5); 4, Ulyap (b. 12, gr. 27); 5, Găiceana; 6, Yablonovka; 7, Nizy; 8, Ulyap (b.15, gr. 43); 9, Staroselye; 10, Gamarnya; 11, Kirovo; 12, Ananyino; 13, Gaston-Uota (gr. 19); 14, Sauk-dere; 15, Zhurovka (b. 401); 16, Voskresensky (b. 4, gr. 1); 18, Krasnodar; 19, Likhachyovka; 20, Ravna (gr. 37); 21, Anapskaya; 22, Galatin; 23, Penc; 24, Lipetsk; 25, Gaston-Uota (gr. 19); 26, Slavnoe (b. 4, gr. 2), 27, Murzikha, 28, Devene

until the late 5th century BC but it should be noted that most of the well-dated burials nevertheless tend to the first half of the 5th century BC. Geographically, daggers of the Găiceana type do not extend beyond the forest-steppe zone and are concentrated in three main regions: the Carpathian–Danube, the Dnieper forest-steppe, particularly the right bank, and the Kuban region of Ciscaucasia (Figure 4).

'Griffin' daggers of Eurasia: looking for eastern parallels

The ornithomorphic and zoomorphic hilts should be studied in the context of a shared Eurasian tradition as daggers with pommels in the form of opposing heads of birds of prey appear throughout the entire Scythian world (Figure 3). We might even distinguish several regions where such daggers were most popular, including the Volga-Ural, 'Seven Rivers' (Zhetysu), western Siberia and northern China (Figure 4). Despite the obvious connection between the 'griffin daggers' of the Urals and eastern Siberia, R.B. Ismagylov insisted on local production.[38] This is indicated, in his opinion, by the fact that they are made exclusively of iron whereas the Tagar equivalents from Siberia are made of bronze. The items from the Volgo-Kama region probably were also made by local Ananyino culture craftsmen, and this is supported by scientific analyses.[39] According to K.A. Akishev, the 'pommels in the form of two heads of griffins are widely distributed only in southern Siberia, the Altai and Zhetysu, and as they move away from these areas they are replaced by the *claw-like* antennae'.[40] It is interesting that he dated the famous Issyk kurgan, which possessed a griffin sword with gold inlay,[41] and for which he was the excavator, to the 5th century BC.[42] Nevertheless, swords and daggers with simple antenna pommels were not widely used in Asian Scythia during pre-Scythian and early Scythian periods. Moreover, daggers with the pommel in the form of opposing heads of griffins or feline predators may be regarded as evidence for connections between the southern Ural peoples and the population of Kazakhstan and the more eastern regions of Eurasia, including the Aral sea region, Zhetysu or Altai.[43]

In 1865, barrow 2 of the Berel cemetery was excavated by F.W. Radloff on the territory of the Kazakh Altai, and dated to the late 6th or first quarter of the 5th century BC.[44] Amongst other grave-goods, this modest grave contained a fragment of a sword hilt covered with gold foil and crowned with opposing griffin heads.[45] This discovery still remains the eastern-most discovery of the ceremonial griffin *akinakes*, beyond either Issyk and Filippovka. In the east of the Scythian world, for example in the area of the Sauromatian and Pazyryk cultures, the image of the 'mythical eagle' does not appear until the mid-6th century BC when the arched form of the pommel was developed. The vast majority of daggers with opposing heads of griffins or mythical eagles date to the second half of the 6th and first half of the 5th centuries BC.[46] The occurrence of griffin daggers in the Pazyryk culture is nicely illustrated by one discovered in a complex in Kumurtuk, which S.V. Kiselev associated with the Minusinsk Basin.[47] In contrast, V.D. Kubarev does not exclude a reverse process, namely from western Kazakhstan to the Altai, Tuva and then to the Minusa Basin because the abundance of finds, in his opinion, indicates the popularity of griffin daggers in central Asia.[48]

Such items were very common in the area of the Tagar culture of the Minusa Basin and middle Yenisei, and until the 6th–5th centuries BC the heraldic heads of griffins replaced all other images on the decoration of Tagar daggers.[49] The main difference from the other griffin daggers lies in the fact that their hilts were decorated with symmetrical figures of crouching predators.[50] At the same time, hilts decorated with the heads of carnivores facing in opposite directions are only found further east, for instance in the northern part of central China (Yangwa, Houzhuang). At the same time, hilts ending in birds of prey or griffins are found both in the east (Laolungchi, Ordos, Maoqinggou), and west (Yadrino, Filippovka). Since these daggers are decorated in Altai 'Animal Style' and do not occur in the Tagar barrows, N.L. Chlenova believed that they most likely entered the Minusinsk Basin from western Siberia, where such items are known in the Ob river basin.[51] Moreover, the earliest bimetallic Tagar daggers, some of which are decorated with griffins, were purely ornamental.[52] Bimetallic daggers are almost unknown outside the Minusa Basin, but this may reflect 'the gradual transformation of bronze products into iron items' on Tagar antiquities. According to M.A. Devlet, this points to the local character of these products.[53]

In northern China, daggers with 'Animal Style' pommels are found at sites belonging to cultures such as Yuhuangmiao, Maoqinggou, Taohongbala and Yanglang.[54] P.I. Shulga believes that daggers with a

[38] Ismagylov 1980: 221.
[39] Kuzminykh 1983: 130.
[40] Akishev 1978: 35.
[41] See Satubaldin *et al*., this volume.
[42] Akishev 1978: 39.
[43] Tairov 2000: 163, fig. 49.2.
[44] Marsadolov 2015: 59.
[45] Sorokin 1969: fig. 21.13.
[46] Umansky, Shamshin and Shulga 2005: 21.
[47] Kiselev 1951: 334.
[48] Kubarev 1987: 57–58.
[49] Bobrov and Moor 2011: 150.
[50] Bogdanov 2006: 90.
[51] Chlenova 1981*a*: 10.
[52] Devlet 1968: 30.
[53] Devlet 1968: 31.
[54] Jin 2009: 137, 152–54.

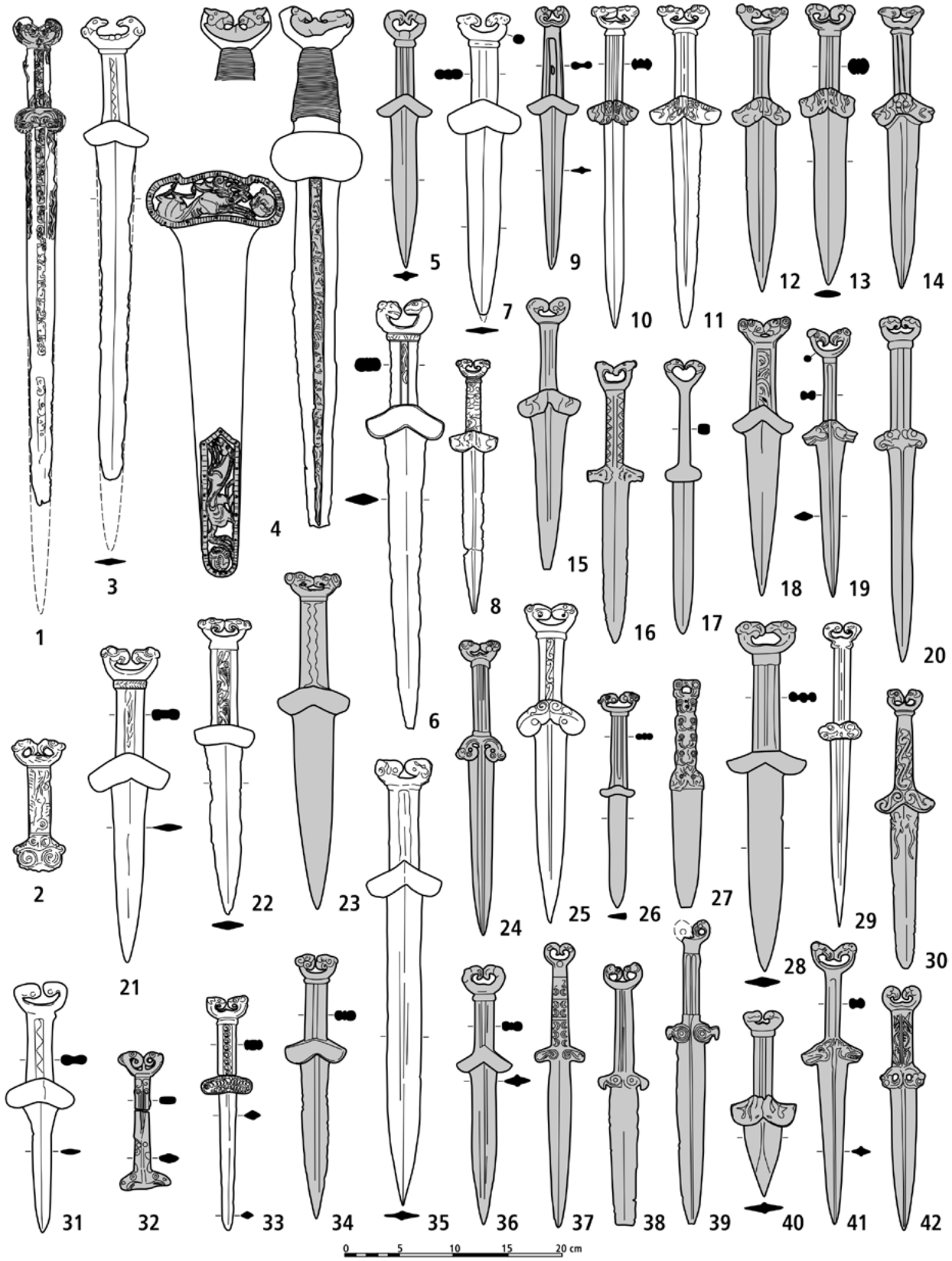

Figure 3. Griffin daggers and swords (selected items): 1, Filippovka (b. 1); 2, Yadrino; 3, Sterlitamak; 4, Issyk; 5 Kayndu (b.2); 6, Dolgoderevenskoe; 7, Novodanilovka; 8, Slavyanka; 9, 10, 14, 18, 20 Minusa Basin; 11, Batoy; 12, Znamenka; 13, Bateni; 15, Sedelnikovo; 16, Yangwa; 17, Gongsuhao; 19, Andronova; 21, Samara; 22, Rogozikha; 23, Beloyarskoe; 24, Ulandryk III (b. 1); 25, Kordachina; 26, Ulaangom (gr. 26); 27, 30, 37, 38, Ordos; 28, Temir-Sug (b. 18); 29, Aksyzskoe; 31, Mukachevo; 32, Grakhan; 33, Temirshi; 34, Almaty; 35, Kotlik; 36, Tytkesken VI (b.4); 39, Maoqinggou (gr. 58); 40, Staroaleyka; 41, Krasnoyarsk; 42, Kazantsevo

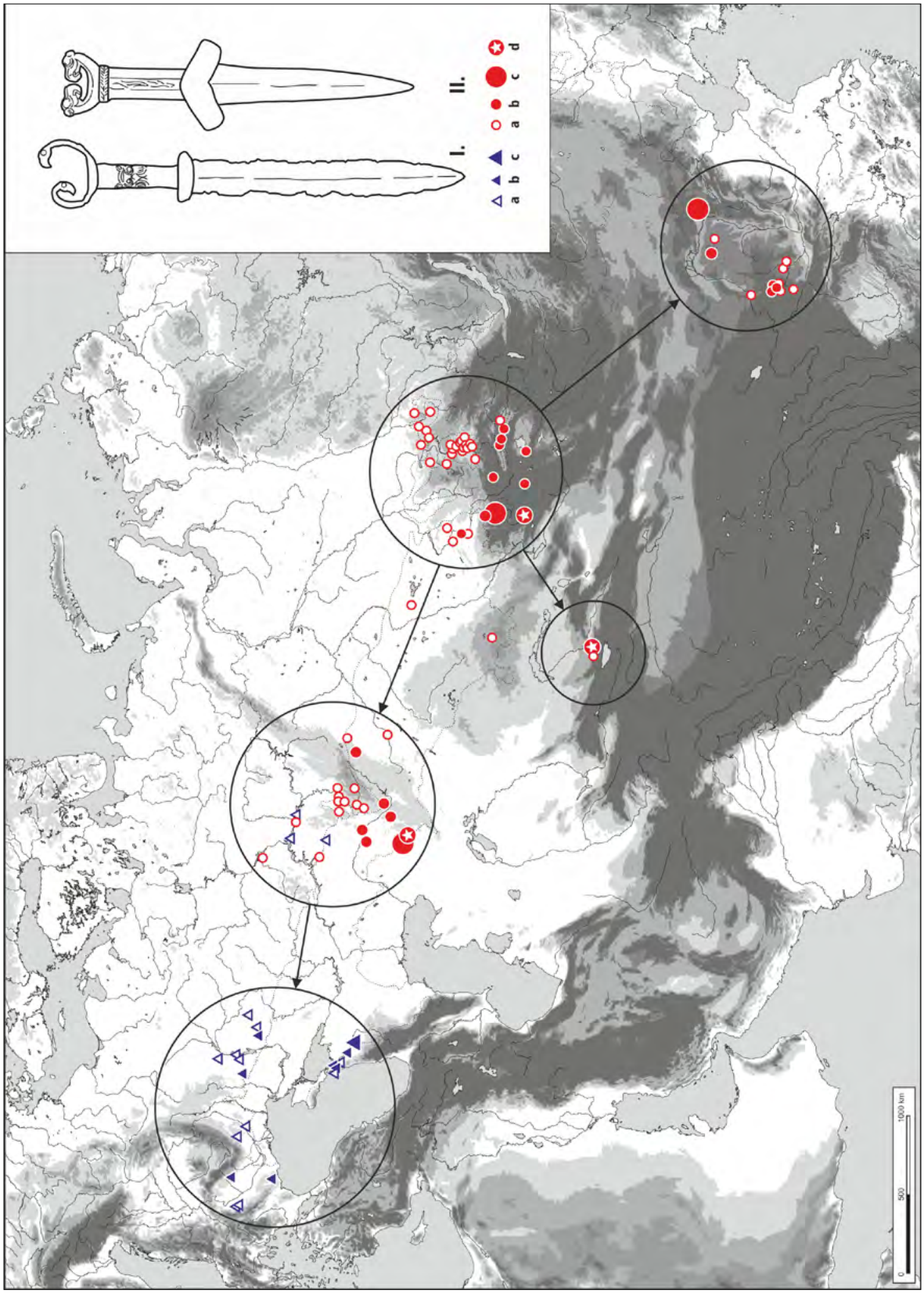

Figure 4. Distribution of ornithomorphic *akinakai* in Eurasia: 1, Găiceana type *akinakai*; 2, griffin daggers and swords (a, stray find, b, single burial, c, 2-3 burials, d, ceremonial item)

pommel in the form of two opposing creatures appeared much earlier in the Yuhuangmiao burial ground than in the Altai or Tuva.[55] At the same time, they are characteristic of the middle of the third stage of this burial ground which dates to the first half of the 6th century BC.[56] Most of the northern Chinese complexes containing daggers with ornithomorphic pommels are discovered in the Maoqinggou burial ground (burials 45, 58, 59, 70).[57] All were initially assigned to the early phase of that cemetery, specifically burials 58 and 45 to the first half of the 6th century BC, and burials 59 and 70 to the second half of the 7th century BC.[58] However, according to Russian researchers, such an early dating is unjustified since the horse-bits with large circular endings found in burial 70 cannot be earlier than the late 6th century BC.[59] The grave-goods from the Gongsuhao burial ground (Hangin-Qi, Ordos, China) of the Taohongbala culture in inner Mongolia contained a dagger with a griffin pommel.[60] Daggers with ornithomorphic pommels come mainly from Ordos.[61] To the south, in Ningxia (NHAR, China), a bronze dagger with a pommel in the form of opposing birds' heads was found together with the 'ge' (戈) dagger-axe of the late 'Spring and Autumn' periodwhich dates from the 6th to first half of the 5th centuries BC, and a burial of the 3-Samencun cemetery (Guyuan county, China) of the Yanglan culture.[62] Short swords with ornithomorphic pommels are also known as chance finds in Ningxia: Xianma,[63] Niding,[64] Yangwa,[65] Guyuan,[66] Mazhuang[67] and Gansu: Houzhuang,[68] Ligou,[69] Wangjia.[70]

If we summarise the chronological situation, we can conclude that griffin daggers appear across the wide spaces of the Scythian world no earlier than the mid-6th century BC and lasted for about a century. The latest items date to the 5th and even 4th centuries BC, and are ceremonial forms decorated with gold, for which a certain time delay is usually characteristic. Interestingly, ceremonial forms are associated with three regions: the Volga-Ural, 'Seven Rivers' (Zhetysu) and southern Siberia. It is not easy to determine the origin of an innovation such as the griffin design of a pommel. Despite numerous attempts to promote an earlier date for the northern Chinese items, it is not yet possible to resolve this issue within the Chinese homeland, at least within the framework of this paper. The extreme western periphery of the Volga-Ural region can be considered only as a source of further evolution of griffin daggers and their subsequent penetration into the Black Sea and the Danube region. Most likely, the canons of imagery and morphology of the griffin dagger united somewhere in central Asia, by which I include Altai, Tuva and the Minusinsk Basin. This is supported by the frequency and diversity of types of griffin daggers – whether iron or bimetallic – among which there are varieties which are characteristic only of the Sayan-Altai region. Among these are items with hilts bearing figures of crouching predators. In addition, it is reasonable to consider that this hilt design pre-dates those decorated with 'muzzles' of predators or heads of birds (griffins), because those daggers were predominately made from iron rather than bronze.[71]

'Uglifying' the pommel: stylised pommels of Gryshchentsy type

The image of a bird of prey was part of Scythian art from its very origin, and was employed on scabbards and chapes.[72] A.R. Kantorovich claims that 'the theme of the griffin, which came from the ancient Greek and the Asian art, found itself in the Scythian environment of the 7th–6th centuries BC was not popular enough in its pure form, being replaced by syncretic images'.[73] Nevertheless, the image of the griffin influenced the wider distribution of the image of the eared bird or Scythian griffin. However, from the second quarter of the 6th century BC, Greek influence – such as the motif of the volute – was imposed on Scythian archaic iconography, leading to the emergence of a new and very popular Scythian-Greek motif.[74] Moreover, the Scythian 'Animal Style' itself evolved over time from clear and realistic images to schematic decorative versions.[75] A.I. Melyukova considered antenna pommels treated in 'Animal Style' to be more characteristic of Scythia. In her opinion in this case most were decorated in the form of claws of a bird of prey, and only three take the form of bird's or griffin's heads.[76] Firstly, scholars describing Scythian antenna pommels only drew attention to the stylised image of the heads of griffins, birds of prey, or even calves.[77] B.N. Grakov and N.Ya. Merpert considered that the antennae to be rendered like the claws of a bird of prey ('the blow of the sword is like a blow of the eagle's claw'), while the depictions of eyes at the base of the pommel were connected with a second motif of the 'vigilance and accuracy'.[78]

[55] Shulga 2013*b*: 385; 2015*b*: 123.
[56] Shulga 2015*b*: 115, fig. 74.
[57] Höllmann, Kossack and Jettmar eds 1992: pls 23.1, 27.1, 29.4, 36.4.
[58] Rhi 1992: 29; Jung Suk-Bae 1998*a*: 8.
[59] Kushakova and Chugunov 2010: 151.
[60] Schimmelpfennig and Kossack 1992: 26, fig. 14.1.
[61] Salmony 1933: pl. 39.1, 2, 4; Loehr 1949: 72, pl. 4.13.
[62] Jung Suk-Bae 1998*b*: 24, fig. 1.2.
[63] Yang and Qi 1999: 33, fig. 4.14.
[64] Ningxia Huizu Zizhiqu Bowuguan Kaogudui 1987: 774, fig. 3.1.
[65] Zhong and Han 1983: 204, fig. 1.1.
[66] Zhong and Han 1983, 206, fig. 4.
[67] Ningxia Wenwu Kaogu Yanjiusuo and Ningxia Guyuan Bowuguan 1993: 29, fig. 16.1.
[68] Liu and Xu 1988: 415, fig. 5.6.
[69] Liu and Xu 1988: 420, fig. 17.1.
[70] Xu and Guo 1986: 40, fig. 1.1.
[71] Devlet 1966: 8.
[72] Topal 2015: 63–70.
[73] Kantorovich 2015: 34.
[74] Kantorovich 2015: 31.
[75] Melyukova 1989*a*: 101.
[76] Melyukova 1964: 55.
[77] Bobrinsky 1894: 164; Miller 1910: 115; Rostovtseff 1925: 419.
[78] Grakov 1947: 70, 71; Merpert 1948: 78.

One of the first documented *akinakai* with ornithomorphic pommel design, butterfly-shaped hilt and triangular blade was a chance find from the collection of A.A. Bobrinsky made near Grishchentsy village in Kanev district.[79] This specimen gave its name to an entire group of swords which are now described as the Grishchentsy type (Figure 5). Burial complexes with Grishchentsy *akinakai* are mainly concentrated in two main regions: the forest-steppe part of the middle Dnieper river, particularly along the left bank, and the northern Caucasus (Figure 6). Judging by the dating of these sites, the Grishchentsy type does not extend beyond the 5th century BC and most likely dates only to the second and third quarters of that century. Another important feature to be noted is that steppe burials are usually later than those of the forest-steppe, with the exception of the Caucasus. Stray finds are also characteristic of the forest-steppe. They form a traditional cluster in the interfluve between the Desna and Volga rivers, and extend eastward to the Kama and Volga-Ural regions. The western distribution is less representative, the most westerly finds being discovered in northern Bulgaria and southern Transylvania (a unique sword from Dobolii de Jos). It should be noted that some stray finds enter the steppe but this trend only becomes common in the classical Scythian period.

End of 'uglification': Solokha type of the classical Scythian period

It is clear that the typical Scythian openwork pommel in the form of stylised birds' heads or the claws of a bird of prey with an eye at the base is a stylistic development of earlier types of pommel which were rendered in a more realistic manner.[80] Without entering into more detailed discussion of the meaning of this design, it is appropriate to raise the question of the functional and chronological characteristics of this type of *akinakai*. So, for example, R.B. Ismagylov notes only the practical character of the pommel and treats it as a late feature which, in his view, was formed by the end of the 5th century BC.[81] R.B. Ismagylov explains the appearance of a horizontal bar between volutes as a reflection of the need for a rigid construction at the top to allow overlay with gold foil. According to him, this innovation appeared in Greek workshops for the manufacture of ceremonial items, and was later adopted by the Scythians.[82] However, it should be acknowledged that we are not dealing with ceremonial forms in the generally accepted sense, but instead with elements of funerary rituals, hence as these golden plates lack any scratches, dents or scrapes they illustrate that the gold was only added to the hilts immediately prior to burial.[83] It is interesting that such pommels are not only characteristic of swords, as the lower part of the iron handle of the mirror from the northeastern chamber of the Chertomlyk mound is also decorated and treated as 'stylized claws of a bird of prey' (Figure 1.9);[84] this mirror was evidently made in the first half of the 4th century BC.[85]

A.I. Melyukova allocated *akinakai* with 'Animal Style' pommels as a separate class in her typology (second group, second sub-group), distinguishing swords and daggers with a 'claw' pommel as a second type.[86] However, it seems that this type of *akinakai*, with a strongly stylised pommel designed in the form of birds' heads or griffins, volutes with kinks and crossbeams, better deserves the eponymic approach. Videlicet is the name of one of the first and most famous Scythian burials to be discovered to produce this so-called Solokha type. In addition to its pommel, this type is distinguished by grooves along the edges of the hilt which are an imitation of a wire or cord binding designed to prevent the sword from slipping in the hand,[87] and the hilt is often decorated with animals or geometric designs (Figure 7). In general terms the observations for this type were formulated by the author of this paper while collecting parallels for a sword found in a burial near Purcari,[88] and elaborated in a series of other papers.[89] Previously, V.I. Gulyaev and I.B. Shramko also paid attention to this series.[90]

Funerary complexes containing swords with a 'claw-like' pommel of the Solokha type date to the 4th century BC, contain ceremonial forms of swords decorated with gold, and are dated by analogy with other rich burials. For ceremonial or prestige items, the phenomenon of chronological delay is particularly valid since valuable weapons could be stored for a long time and passed from generation to generation. In theory these burials could even have been made at a period when this type of sword had already disappeared from common use. A good example is the hilt of the 5th century BC Achaemenid sword discovered in the Chertomlyk barrow which dates to the end of the third quarter of the 4th century BC.[91] Nevertheless, the Solokha type most likely appears at the turn of 6th–5th centuries BC and existed until the end of the 4th century BC. Chronologically, the complexes with Solokha *akinakai* can be divided into three groups which are dated respectively to the second and third quarters of the 5th

[79] Bobrinsky 1914: 105, fig. 27.
[80] Merpert 1948: 78; cf. Melyukova 1964: 56; Gavrilyuk and Tairov 1993: 80–81.
[81] Ismagylov 1978: 232–33.
[82] Ismagylov 1978: 232.
[83] Chernikov 1965: 124; Gulyaev 2009: 151.
[84] Alekseev, Murzin and Rolle 1991: 197–98, cat. 118.
[85] Alekseev, Murzin and Rolle 1991: 126.
[86] Melyukova 1964: 55–59.
[87] Ginters 1928: 39.
[88] Agulnikov *et al.* 2013.
[89] Topal 2014*a*: 198–207; Topal, Ţerna and Popovici 2014: 33–57.
[90] Gulyaev 2004: 14; Shramko 1992: 222.
[91] Alekseev, Murzin and Rolle 1991: 92–102, 130–31, fig. 67, cat. 192; Alekseev 2003*a*: 268–69; 2003*b*.

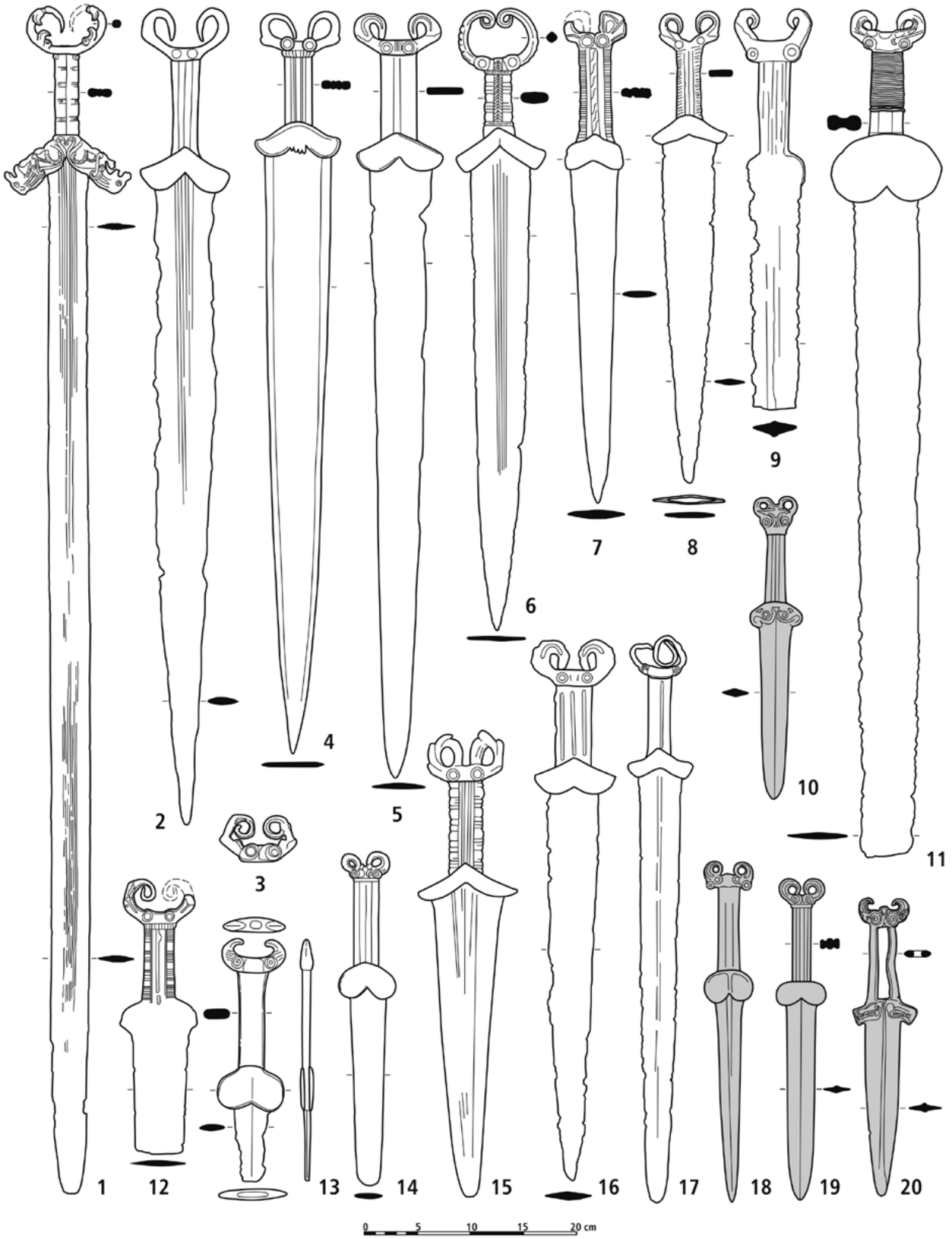

Figure 5. Grishchentsy type and stylised griffin daggers and swords (selected items): 1, Dobolii de Jos; 2, Ekaterinoslav; 3, Bel'sk hillfort; 4, Krasnyi Dubki; 5, Grishchentsy; 6, Energetik; 7, Argayash; 8, Afanasyevka; 9, Goznitsa; 10, northern China; 11, Klyuchi; 12, Sviyazhsk; 13, Ananyino; 14, Solovka; 15, Pilikovka; 16, Uman; 17, Ozerki; 18, Malaya Inya; 19, Beixingbao (gr. 1); 20, Klyuch Gremyachy

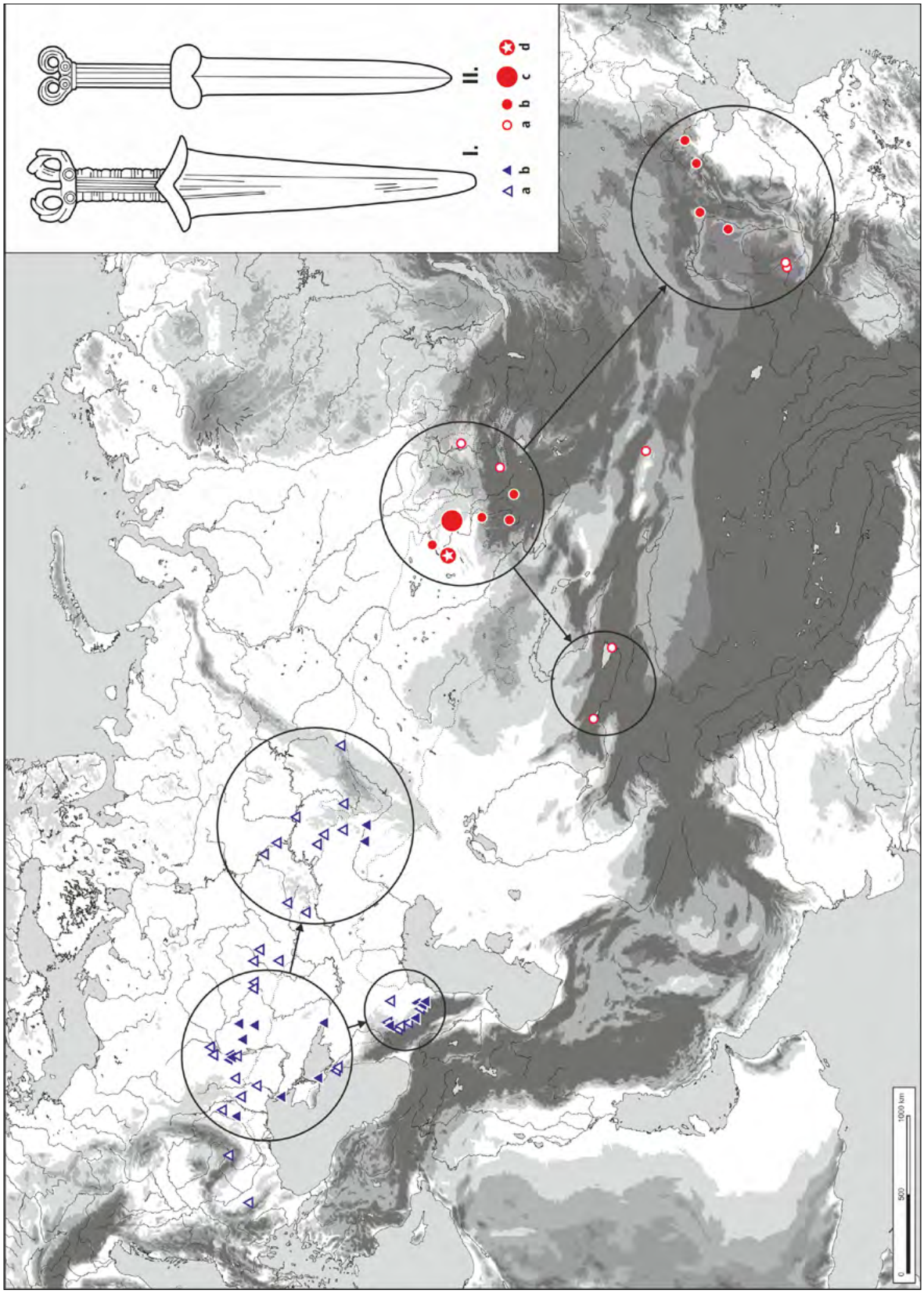

Figure 6. Distribution of stylised ornithomorphic *akinakai* in Eurasia: 1, Grishchentsy type *akinakai*; 2, stylised griffin daggers and swords (a, stray find, b, single burial, c, 2-3 burials, d, ceremonial item)

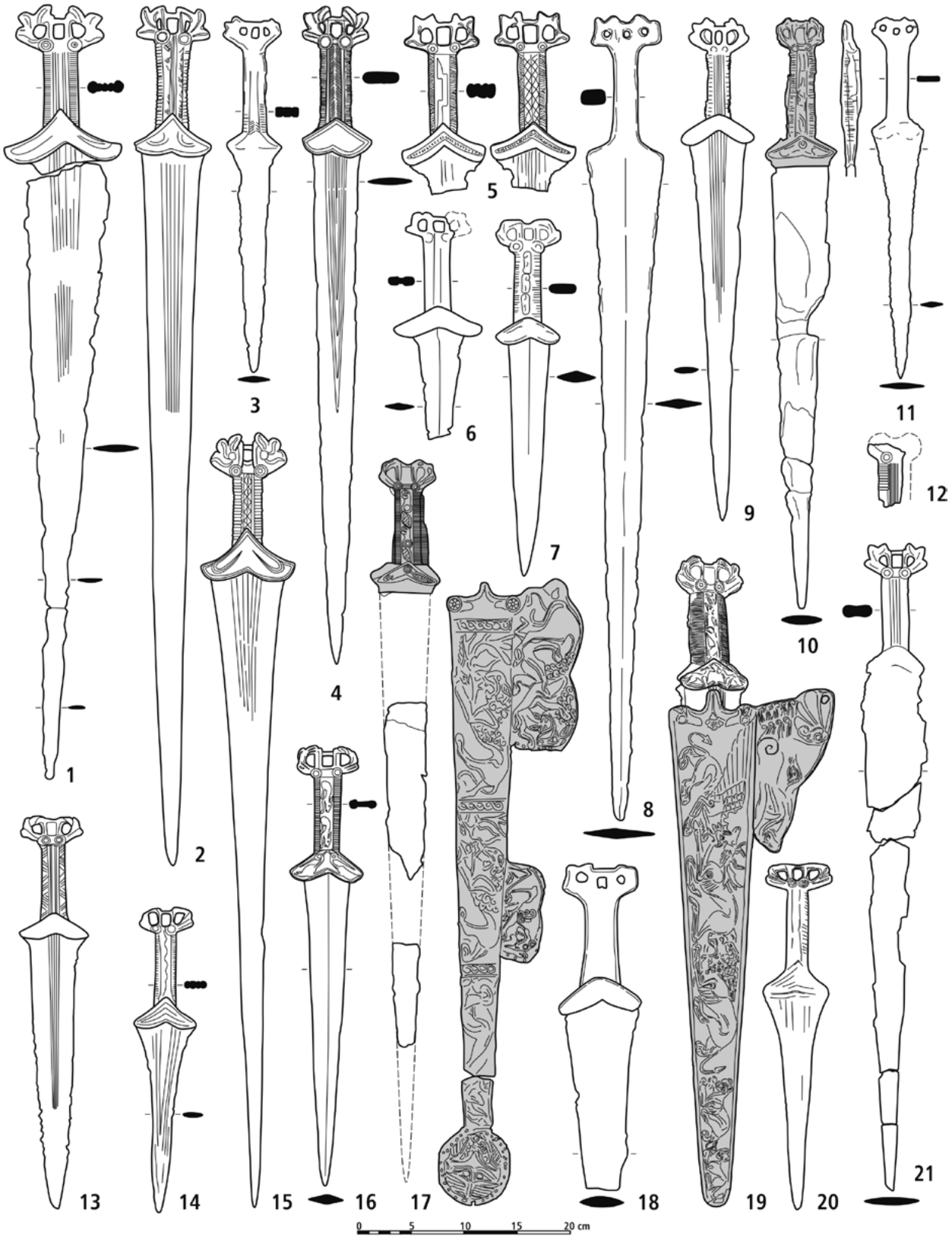

Figure 7. Solokha-type *akinakai* (selected items): 1, 5 Vyazivki, 2 Cheganda, 3 Akhrat, 4 Shnyaevo, 6 Dadanovka, 7 Talachevo, 8 Yablochnyi, 9 Kiev Museum, 10 Pereshchepino (b.3, gr. 2), 11 Mastyugino, 12 Nagornoe (b.5, gr. 1), 13 Sadovka, 14 Ufa, 15 Agatovo, 16 Novaya Bogdanovka, 17 Solokha (b.), 18 Zhabotin, 19 Velika Belozerka, 20 Pokhvistnyovo, 21 Purcari (b.7, gr. 3)

century BC, from the end of the 5th to the first third of the 4th century BC, and the second half of the 4th century BC. Early complexes are concentrated on the left bank of Dnieper river in the forest-steppe of Ukraine although a single complex is also known from the Kuban region. In addition, at this time, representations of Solokha *akinakai* appear on monumental sculptures, for instance a statue from Krasnodar Museum which was possibly found near Pregradnaya village in Russia,[92] and Ternovka in the Mykolayiv region of Ukraine.[93] The pommel of an *akinakes* on the Krasnodar statue is depicted in a typically Solokha style with detailed volutes. The date of the Krasnodar statue is evident from the additional representations of a griffin and a deer on his body armour,[94] and does not permit a dating later than the first half of the 5th century BC.[95] The hilt of the *akinakes* on the Ternovka statue is sub-triangular, has a longitudinal strip – and most likely a horizontal corrugation – and the pommel is treated in the form of opposed claws: the most likely dating of this statue, based on the features of the image of the top of the bow which is in the form of an eagle's head, is to the second half or even end of the 5th century BC.[96]

The period of widest distribution of swords of this type was the last decade of the 5th century and the first third of the 4th century BC, judging by the overwhelming number of dated complexes belonging to this period. This is also the period of the largest number of ceremonial swords, the handles, and often the scabbard, of which are decorated with gold, but these are only distributed along the left bank of the Dnieper and the lower Don. Later, Solokha-type *akinakai* penetrate to the right bank of the Dnieper, continue to the steppe and reach the lower Dniester, and to the east they enter the Volga–Ural region; numerous stray finds in the Volga-Don forest-steppe are also associated with the latter period. During the second half of the 4th century BC, i.e. at the final stage of their development, Solokha *akinakai* appear in the Crimea, as well as in burials in the southern Urals and Trans-Urals. It is interesting that it is during this period that mirrors with their handles designed in Solokha style appear.

The geographic distribution of finds of swords and daggers of the Solokha type is quite clear (Figure 8). The complete absence of Solokha *akinakai* in Transylvania, the Great Hungarian Plain, eastern Romania and Crimea, and their almost complete absence from the Caucasus is indicative, the only exception being a stray surface find from the Third Yalkhoy-Mokhk burial ground from southeast Chechnya.[97] Burials with swords and daggers of Solokha type tend to be found only in two main regions: the Dniester-Seversky Donets and the Urals. The concentration of swords in the Vorskla-Sula region caused I.B. Shramko to suggest localising the centre of their production to the Bel'sk hillfort, where the blacksmiths mastered the processing of ferrous metals and gold.[98] It is interesting that the Sauromatian complexes with swords of the Solokha type mainly extend into the southern Urals and there is a huge number of stray finds between the Don and Ural rivers. The distribution map of Solokha swords and daggers is an excellent illustration of the ethno-cultural situation during the 5th and 4th centuries BC in European Scythia.

In the later classical Scythian period, from the mid-4th century BC, when the centres of the production of bladed weapons shifted further south, the antenna pommel practically disappears from the repertoire of Scythian armourers. It was then that the Solokha type was developed, apparently in the forest-steppe on the left bank of the Dnieper river. For the early period of its development, i.e. the first half of the 5th century BC, only forest-steppe complexes are characteristic. Beyond that the overwhelming majority of ceremonial forms originate from the left bank of the Dnieper.[99] The distribution of the later types, such as the Chertomlyk *akinakai* and, closely associated with them, swords of the Shulgovka type, go in the opposite direction, i.e. from south to north, and along the right bank of the middle Dnieper. The chronology of complexes with swords of the Chertomlyk type last for the duration of the 4th century BC, and their maximum distribution was in the third quarter of the 4th century BC, whereas the Shulgovka type does not extend beyond the second half of the 4th century BC.[100] It is significant that forest-steppe complexes with single-blade swords of the Shulgovka type appear much later than those on the steppe and they are located exclusively on the right bank of the Dnieper. Continuing the comparison with the Solokha type, one can note a significant narrowing of the area of the Chertomlyk swords and daggers, and the eastern limit of burial complexes with the Chertomlyk *akinakai* is along the Don, and the second most important concentration of burials with these items is no longer the lower, but the middle Donets. The trajectory of this final line of development of Scythian *akinakai* clearly reflects particular trends in Scythian culture at the end of the 4th century BC, and which led to the disappearance of *akinakai* as a cultural tradition. This contradicts a common assertion that by the 4th–3rd centuries BC the number of Scythian burials with blade weapons 'markedly increased'.[101] A recently published sword of the Chertomlyk type in Chyhyryn

[92] Miller 1925: 109, fig. 7.
[93] Elagina 1959: fig. 3–6.
[94] Popova 1976: 111.
[95] Olkhovsky and Yevdokimov 1994: 34.
[96] Elagina 1959: 193; Schulz 1976: 220; Petrenko 1986: 170; Olkhovsky and Yevdokimov 1994: 18.
[97] Makhortykh 1987: 58, fig. 2.7.
[98] Shramko 1992: 222.
[99] Topal 2014*a*: 389, fig. 1.
[100] Topal 2014*b*: 136, 150, fig. 7.
[101] Melyukova 1964: 46.

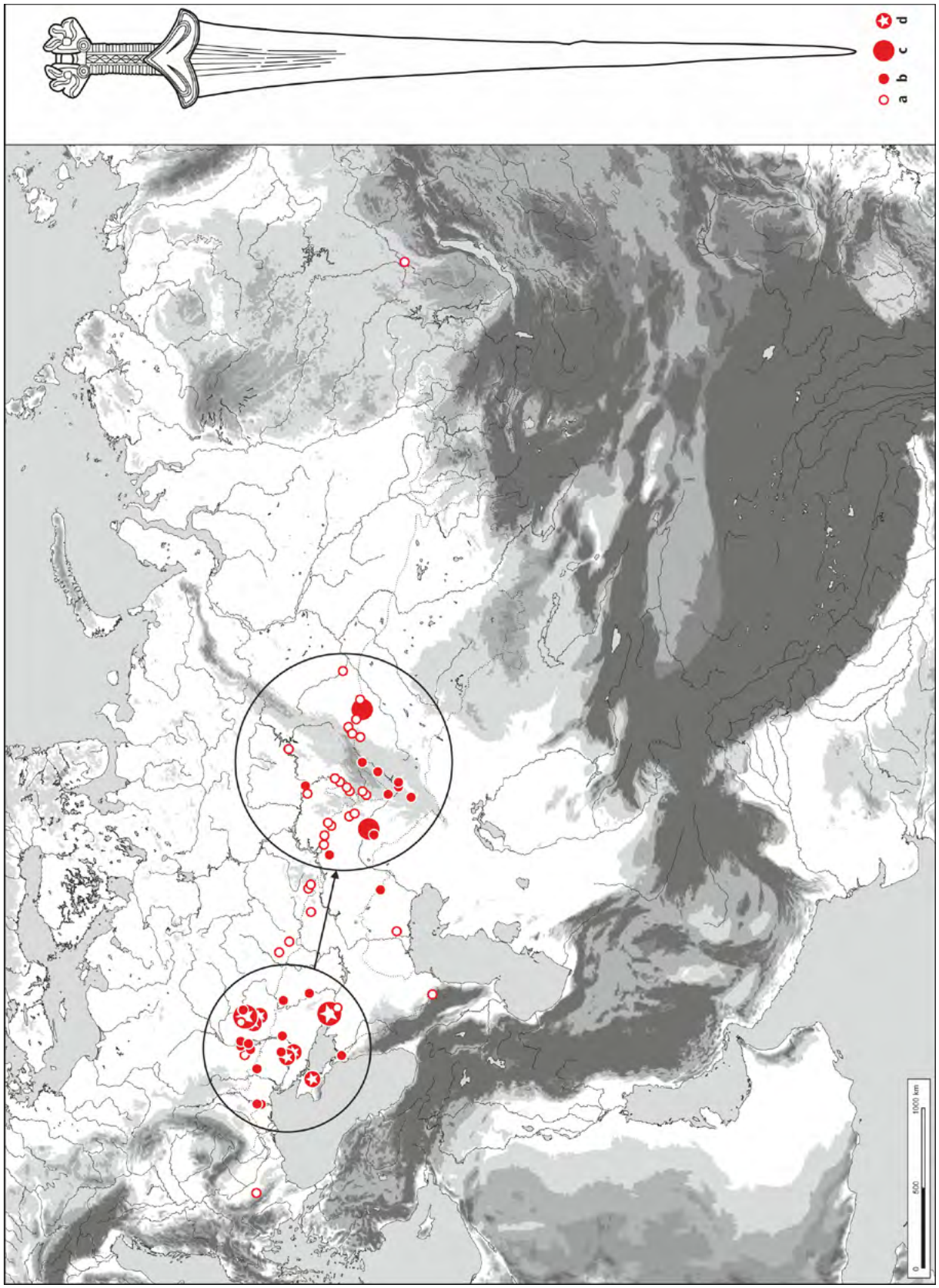

Figure 8. Distribution of Solokha type *akinakai*: a, stray find; b, single burial; c, 2–3 burials; d, ceremonial item

Museum which was found near Kurilovka in the Kanev district of the Cherkassy region is of particular interest.[102] Its pseudo-triangular hilt is decorated in relief with representations of feline predators and a possible griffin, typical of Chertomlyk *akinakai* but in this case very unusual as it has an antenna pommel.

Conclusions

Antenna pommels appear during the second half of the 7th century BC and from that time onward, simple antenna pommels are only common in three regions: the north Caucasus, the Dnieper forest-steppe and the Carpathian-Danube region. Nevertheless, the antenna pommel of the early Scythian period is rather an experimental exception than a formalised tradition. It is also worth noting that the typology of *akinakai* based only on the shape of pommel is hopelessly outdated. Ambivalence in the design of the pommel is demonstrated by the history of Scythian blade weaponry in all periods, beginning with the early Scythian period when we find Kelermes and Gudermes *akinakai* with antennae or volutes. During the middle Scythian period, we see antennae on *akinakai* of Shumeyko and Vettersfelde types or single-edged swords of the Nograd type. The period of widest distribution of antenna pommels is the end of the middle Scythian period, i.e. the second half of the 6th to 5th centuries BC.

During the second half of the 6th century BC on the territory of European Scythia *akinakai* with ornithomorphic antennae pommels appear: these are not associated with the early Scythian production centres of *akinakai* with simple antenna pommels. Apparently, the appearance of ornithomorphic and zoomorphic pommels fits within a framework of a common Eurasian tradition: the griffin-daggers at that period are common in the Volga-Ural, 'Seven Rivers' (Zhetysu) and Sayan-Altai regions and northern China. Nevertheless, the ornithomorphic pommel of the Găiceana type appears on a wide series of swords and daggers with a segmented hilt. From the 5th century BC, the simplification of the ornithomorphic pommels begins, a first step in their digression from realism.

Finally, at the end of the 5th century BC the ornithomorphic design is finally schematised into a purely ornamental motif. Over time, the typology of antenna pommels in the shape of the heads of birds of prey gradually evolves from large realistic forms towards minimization and schematism, perhaps connected with the loss of the original meaning of the image. The manner of this schematisation is interesting and, when studying the change of design, it is not difficult to see that over time the bird's eyes are placed at the base of the pommel. Why did this happen? The answer is prompted by complex zoomorphic compositions which not only decorate the pommel, but also the hilt on a number of *akinakai*. Closer examination of many specimens shows that they have been turned upside-down and, in particular, the figures of recumbent predators on Tagar daggers or the hilt of the sword from Dobolii de Jos. This inversion is closely dated to the second and third quarters of the 5th century BC, because on *akinakai* of the Solokha type – which date to the classical Scythian period from the end of 5th to the first half of the 4th centuries BC – the composition returns to its original position and faces down the blade (Figure 9). Despite the widespread distribution of schematic ornithomorphic pommels of Solokha type, within the framework of this series there are several items executed in the same style but equipped with an elongated oval pommel instead of an antenna. At the end of the classical Scythian period antenna pommels became less popular on the swords and this design became the exception rather than the norm.

[102] Sivolap and Shelekhan 2014: fig 1.5–5a.

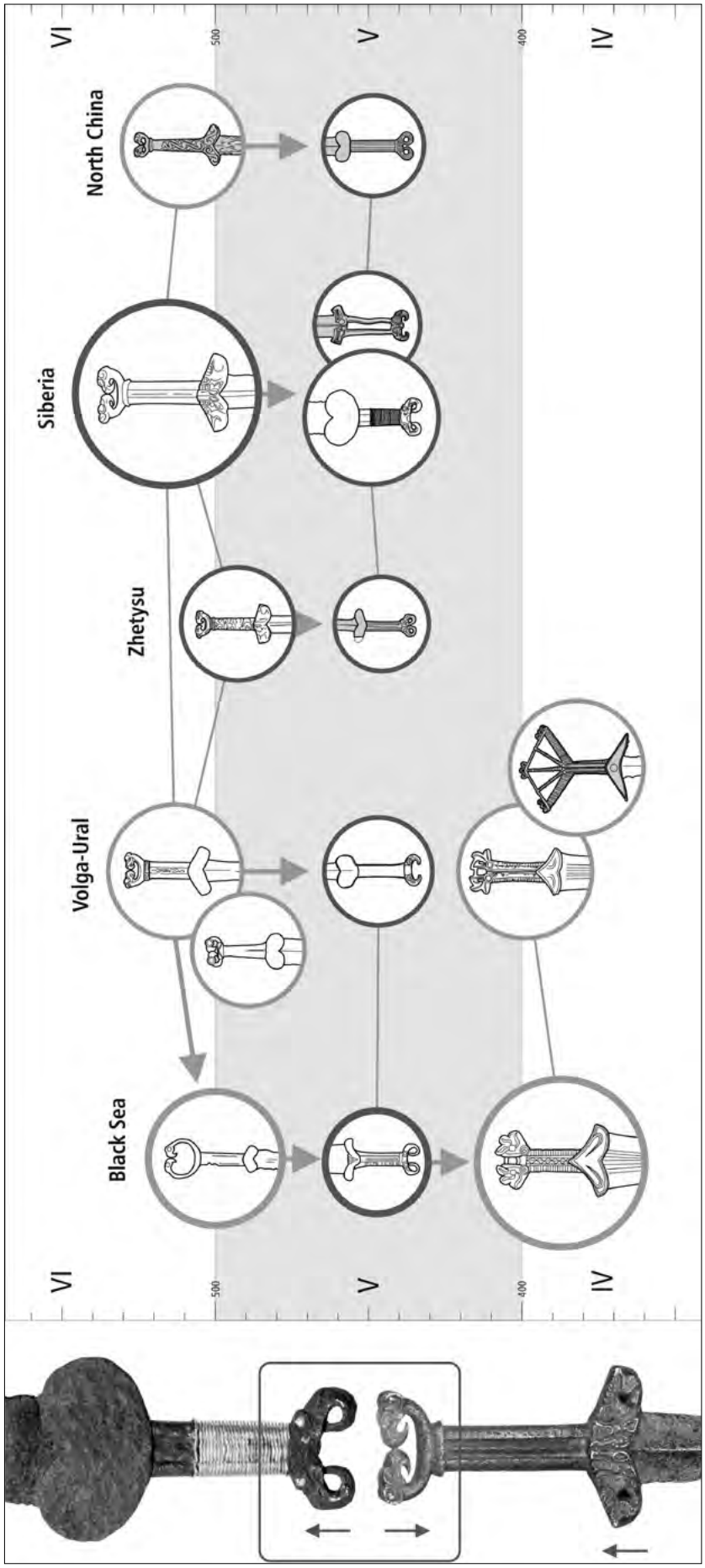

Figure 9. Chronology of ornithomorphic Scythian *akinakai*

Settled rather than saddled Scythians: the easternmost Sakas

Burzine Waghmar[1]

Abstract

At the easternmost edge of the Iranic world, settled rather than saddled Scythians ran the kingdom of Khotan as Iranian-speaking Buddhists who traded and tussled with their T'ang and Tibetan neighbours. Straddling the Sino-Tibetan and Irano-Indic oecumenes, these Saka dynasts of the southern 'Silk Road' were conquered and converted by the Turkification and Islamisation of the Tarim Basin. Their effect, both historical and artistic, merits consideration in Scythian studies for their own achievements. This survey is based on the existing corpora of administrative and religious texts in Khotanese, an amply documented Middle Iranian language, which enables the tracing of the trajectory of these Scythian legatees until the end of antiquity.

Keywords: Bactria; Mahayana Buddhism; eastern Middle Iranian; Khotan; Khotanese Saka; Kushans; Parthia; Sakas; Scythians; Sistan; Tarim Basin; Tillya tepe; Yuezhi

> 'The Scythians, however, though in other respects I do not admire them, have managed one thing, and that the most important in human affairs, better than anyone else on the face of the earth: I mean their own preservation. For such is their manner of life that no one who invades their country can escape destruction, and if they wish to avoid engaging with an enemy, that enemy cannot by any possibility come to grips with them'.[2]

> 'The Bactrians and Parthians descended from the Scythians,
> as did Attila the Great ... Our Lombards, Hungarians, Castellani, and Goths are descended from the Scythians ...
> The Turks too ... came from Scythia'.[3]

> 'In every age the immense plains of Scythia, or Tartary, have been inhabited by vagrant tribes of hunters and shepherds, whose indolence refuses to cultivate the earth, and whose restless spirit disdains the confinement of a sedentary life. In every age, the Scythians, and Tartars, have been renowned for their invincible courage, and rapid conquests'.[4]

At the easternmost edge of the Iranic world, settled and not saddled Sakans, as Iranian speakers and Buddhist practitioners, ran the kingdom of Khotan which traded and tussled with its T'ang and Tibetan neighbours respectively.[5] Straddling the Sino-Tibetan and Irano-Indic oecumenes, these eastern Saka dynasts of the southern 'Silk Road' came to an end with the Turkification and Islamisation of the Tarim Basin.[6] Their impress, historical and artistic, merits consideration in Scythian studies for its own achievements.

This survey draws on our corpora of administrative and religious texts in Khotanese, an amply documented Middle Iranian language, which enables one to trace the trajectory of these *supposed* Scythian legatees down to the end of antiquity. As Sir Harold Bailey rightly observed: 'Early Saka people had no occasion to write books or documents ... Khotan is thus the only ancient Saka state which we can know intimately from its own writings'.[7]

It cannot be gainsaid that the said Sakas must not be deemed direct descendants of those mounted nomads constituting the theme of the exhibition and accompanying conference. Indeed, there is nothing to suggest linguistically, genetically or culturally, what with the vast stretches, temporal and spatial, which preclude descrying much less discerning socio-cultural congruences. Subsumed as the Khotanese are under the ethnonym Saka, this Iranian-speaking group is but one among several under that imprecise ethnic nomenclature. One might be permitted a cue from Gibbon who pleaded: 'I indifferently use the appellation of *Scythians*, or *Tartars*'.[8] Literary license, however, cannot endorse academic inaccuracy even if

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[2] Herodotus, *The Histories* 4.46.
[3] Bergamo, *Supplementum*.
[4] Gibbon, *Decline and Fall*: Womersley ed. 2005: vol. I, 1025.
[5] Dickens 2018: 863.
[6] Sundermann 1996: 470; Soucek 2000: 302; Higham 2004: 339–42; Dickens 2018: 1454 with correction therein for he misattributes Soucek's authorship to a 'G.R. Smith' in his bibliography.
[7] Bailey 1978: 5 in the maiden issue of *Afghan Studies* was the published version of a lecture read at the inauguration of the Society for Afghan Studies, London, 1972.
[8] Womersley ed. 2005: 1025.

some residual vestige lingered in classical and medieval sources that Gibbon would have consulted. He would, in all likelihood, have been aware of that aforementioned Augustinian monk, da Bergamo's universal chronicle of 1483, whose enthusiasm for genealogically tracing a multitude of marauders to the Scythians is almost superstitious.[9] One may mitigate by adducing that such vestigial notions of ethno-genesis need not be dismissed as wholly untenable. Both late Russian academicians, Elena Efimovna Kuzmina and Vadim Mikhailovich Masson, adumbrate these antecedents with conflated qualifiers.[10] Likewise Sir Barry Cunliffe who remarks: 'Predatory nomadism first becomes apparent in Scythian-Saka cultures from the 9th to the 8th century BC'.[11] Herodotus, lest it needs reminding, plainly noted:

> 'The Sacae, a Scythian people, wore on their heads the *kurbasia*, a tall, pointed cap made of stiff material, they sported trousers, and, in addition to their native bows and arrows, carried battleaxes known as *sagareis*. In fact, these Sacae were Scythians from Amyrgium, but were called "Sacae" because that is the name given by the Persians to all the Scythians'.[12]

Again Sir Harold Bailey observed, in an appropriately-titled lecture, *A Half-Century of Irano-Indian Studies*: 'Saka, if we adopt the *Achaemenian value of the word for all* the northerners from the Danube to the Iaxartes, the modern Syr-darya, now survives in Ossetic of the Caucasus and in the Iranian dialects of Shughnān, Wakhān, and Munjān of the Pamirs'.[13]

This disquisition is foregrounded recalling that 1978 exhibition in Great Britain, *Frozen tombs: the Culture and Art of the Ancient Tribes of Siberia*, also mounted at the British Museum in conjunction with the State Hermitage Museum, Leningrad.[14] Recalling Russia's tumultuous century at our October 2017 conference, one harks to Petrograd 1915, two years before the revolution, where Sergei Sergeyevich Prokofiev composed his *Scythian Suite*, opus 20. It was premiered there in January 1916. St. Petersburg, thankfully again it is, to whose enlightened namesake despot, we owe the founding seeds of the collections displayed in London (November 1978–February 1979) and now almost four decades later.[15]

Two years after the debut of Prokofiev's *Scythian Suite*, Mikhail Ivanovich Rostovtzeff (1870–1952) fled Bolshevik Russia and during his English exile at Oxford's Bodleian library wrote daily what duly became a classic, *Iranians and Greeks in South Russia*.[16] Colleagues toeing the party line in the old country felt obliged to debunk 'this greatest of Russian experts in the field' according to whom 'Scythians had appeared from the east as nomadic conquerors, already possessing the animal style in fully developed form, and had superimposed their culture upon the matriarchal peasant communities of southern Russia seemed the epitome of bourgeois arrogance'.[17]

[9] Whitfield 2018: 15, n. 31.

[10] Masson 1988: 102 convincingly stated: 'Since none of the peoples of the Eurasian steppes had a system of writing in ancient times, the scholars of the modern times endeavouring to reconstruct their history and culture relied at first on the antique tradition and, accepting the broad meaning of the term Scythae, regarded all inhabitants of the region as a single people'. Kuzmina (2007: 379–83) is a sound conspectus. She notes how east Iranian tribes in self-styling themselves as *arya* 'noble' was not so much 'self-consciousness of a gigantic Aryan unity' as a 'relic of the common origins of the tribes that had emerged from this unity' (Kuzmina 2007: 382). Bailey apud Vogelsang cautiously observed that 'we may safely assume that many of the newcomers [from south central Asia to northern Afghanistan] spoke an Iranian language and were related to the Scythian tribes that for hundreds of years had dominated the vast expanse of central Asia' (Bailey 2008: 137). The Harvard Iranist and now doyen of Khotanese studies, P. Oktor Skjærvø, in his opening remarks at a 1988 Paris symposium matter-of-factly commented: 'The history of Khotan, a small nation of speakers of an Iranian language, descendants of the Saka, or Scythian, tribes that once roamed the southern reaches of what is today's Soviet Union, is poorly known' (Skjærvø 1991: 255–56). Skjærvø's landmark edition of Khotanese texts has enriched us substantially.

[11] Cunliffe 2015: 459.

[12] Herodotus, *The Histories* 7.64; on Amyrgian Scythians see Piankov 1994 [1996]: 37–39.

[13] Bailey 1972: 103, a lecture delivered at his conferral of the Royal Asiatic Society's Triennial Gold Medal, April 1972; emphasis mine. For Khotanese see Bailey 1958: 132; 1971*a*: 11–12; 1972: 103; 1976*a*: 8–9; 1976*b*: 34; 1979*b*: vii; 1982: 55; Frye 1984: 192; Hoernle apud Emmerick 1992: 6; Frye 1993: 186; Piankov 1994 [1996]: 42–43 furnishes ethnographic data for these east Pāmīrī connections; Mallory and Mair 2008: 112, 255–56; Narain 1998: 33–35; Mallory and Adams 2006: 132; Kuzmina 2007: 381–82; Narain 2013: 39–40. Wakhī is laterally related but cannot be traced back to any known form of Khotanese as reminded in Skjærvø 1989: 375; 2006: 345.

[14] Morris 1978; the exhibition opening was reviewed in Tisdall 1978: 13.

[15] Korolkova 2017*a* charts Czar Peter's attempts at conceiving and coordinating the collection of material cultural remains in the distant Siberian east; also recounted briefly in Jettmar 1967: 13–14, 179–81. Coverage of the British Museum exhibition is in: Aspden 2017; Campbell-Johnston 2017; Hudson 2017; Januszczak 2017; Jones 2017; Kennedy 2017; Leighton 2017*a*; 2017*b*; 2018; Maitlan 2017; Richardson 2017; Sooke 2017; Whitworth 2017; Pankova 2020*a*. The Scythians have consistently captured the public imagination as evinced in lavishly illustrated publications commissioned by Time-Life Books (Trippett *et al.* 1978) and *National Geographic* (Edwardes 1996; 2003). Several catalogues of travelling exhibitions, especially of Scythian gold, have been published: the most recent Russian tome of the Hermitage's Golden Room collection is Alekseev (2012), gifted me by Dr Pavel Borisovich Lur'e, central Asian antiquities curator at the Hermitage, and available in a namesake English edition: A. Alekseev, *The Gold of the Scythian Kings in the Hermitage Collection* (2012). Also see overviews written by Alekseev for other visiting exhibitions of Scythian art in Alekseev 2000*a*; 2000*b*. Piotrovsky [1975]: still repays reading although written for the very first travelling exhibition of 197 loaned artefacts in April 1975, following five years of negotiations, to New York's Metropolitan Museum and the Los Angeles County Museum of Art (LACMA), Los Angeles. Thomas Hoving, then director of the Met, pointed out in the catalogue's foreword that the exhibition came to pass through the efforts of Dr Kissinger, Secretary of State, and was expressly included in the joint communiqué issued on 3rd July 1974 by President Nixon and Premier Brezhnev following the former's official visit to the U.S.S.R. (27th June–3rd July 1974), erroneously noted as 13th July in Glueck 1975: 46.

[16] Rostovtzeff 1922; anon. 1952: 8.

[17] Jettmar 1967: 39. Momigliano 1994: 34, 36 is a timeless sketch first published in 1954 of one great savant by another. He notes how

A first, often overlooked, point is that Scythians, like Cimmerians, are the only peoples identifiable by their name and not artefacts in western central Asia.[18] And in both cases by the Greeks. But we are not concerned with the Royal Scyths of the West but those of the East or the Sakas (transliterated in Chinese sources *sai*) who must be identified with the Issedones.[19] Those Royal Scyths, *hoi basilḗioi Skýthai*, designation of the leading tribe of the Scythian federation is probably an Iranian loan-translation of **saka-rauka* 'Saka-ruling' (*saka-* 'strong', cf. Avestan *sak-*, Old Indian *śak-*) from a base **ru/rau-* 'to rule, command', *rūkyām* (Khotanese gen. pl., an official title), cf. 'ruler' (Khotanese *rrund-* nom. sg. *rre*); and the tribal demonym in classical texts (Greek *sakaraukoi*, *sakaurakoi*, Latin *sacaraucae*, *saraucae*).[20] It lends ballast to the belief of existent bilingual relations between Greeks and Iranians in ancient southern Russia.[21]

Nikolaev and Pankova bring down the curtain on our exhibition's catalogue in their closing chapter entitled 'After the Scythians'.[22] They conclude therein by situating the Scythians as the first of the great Eurasian empires following which came the Sarmatians down to the Türks and Mongols.[23] An echo of this lingers in Christopher Marlowe's transposing a Scythian shepherd's rise to power in the person of that Çağatay Türk of the Barlas tribe hailing from the region of Kiš, modern Šahr-i Sabz (Özbekistān), Tīmūr or Tamerlane (r. 1370–1405). Marlowe's landmark Tudor drama, scripted sometime in 1587/88, and whose title went as, *Tamburlaine the Great, Who, from a Scythian Shephearde, by his rare and wonderfull Conquests, became a most puissant and mightye Monarque*, was published in 1590 at Holborne Bridge, not far from the British Museum.[24] Academically inclined Marlowe, grounded in his classics, assuredly would have known of the Athenian tragic poet and dramatist, Choirilos of Samos, who declared: 'the Saka, sheep shepherds, of the Scythian kin, live in Asia'.[25] Marlowe's opening act, was set in Persepolis, ancient Pārs, homeland of the Achaemenians and, also later, the Sasanians. The fate of the Scythians was, for some three millennia, linked with the imperial destinies of both aforementioned and the Parthian empires.

Our earliest Iranic – and epigraphic – attestation of distinctly enumerated Scythians is in the Old Persian regnal inscriptions. It is by this gentilic (Old Persian *sakā*) that they were subsequently recorded in Indic sources: in Darius's Bīsutūn inscription, (DB I.6, DB II.21), Scythians are listed as *sakā* after the Bactrians, Sogdians and Gandhārans respectively but last mentioned in DB II.21.[26] Likewise mentioned in Darius's Persepolis terrace wall edict, DPe 18, following the lands of Achaemenid India; and DPh 5-6 where that Persepolis tablet's body text commences delineating the empire's four directions, *haca Sakaibiš tayai para Sugdam* 'from the Scythians who [are] beyond Sogdiana'.[27] Far more important is their distinctive enumeration and pairing in Xerxes' *daiva* or trilingual (Old Persian, Elamite, Babylonian) inscription at Persepolis, XPh 26-27, *sakā haumavargā, 'haoma*-venerating Scythians', *sakā tigraxaudā* 'the Amyrgian Scythians, Scythians with pointed caps'.[28] The former are inconclusively conjectured to be the easternmost Sakas somewhere

any 'talk on Rostovtzeff was discouraged or controlled' although Soviet authorities published an ethnographic history of southern Russia in 1925 from a draft manuscript Rostovtzeff had left behind: he remained unaware of it until much later. Rostovtzeff 'already knew the Hellenistic side of this civilization, soon proved to be an authority on Scythians and Sarmatians as well. In following up his nomads, he reached the borders of China and tackled problems of Chinese art whenever they could throw light on the Iranian elements of southern Russia.' Ideological skewering of sources by communists is matched by that of chauvinists as evident in a recent multi-volume, pan-Turanian project: 'The Uralo-Altaic view, the strongest, most recent view, and the idea that the Scythians were Turkish have [*sic*] gained more and more support. Scientists evaluated the issue with [*sic*] all aspects of it [*sic*]'. Putting paid a century-plus of scholarship on the ethnohistoric, namely Iranic, record inspires this *pièce justificative* by Çay and Durmuş 2002: 162; cf. Jettmar 1967: 17 for this fixation of 'Turks in art' universally and Taishan (1998: 152) on the baseless originating of Saka, Wusun and Yuezhi tribes as Türks from the Altai. Their just as frenzied Iranian counterparts, especially in the diaspora, remain ignorant thankfully of the now more than half-century-old writings of Yale University's Ukrainian émigré historian, George Vladimirovich Vernadsky (1887–1973). His broad strokes, predicated on superficial philological similarities and an over enthusiastic recognition of Iranian cultural ubiquity across ancient Russia, discredited his wide readings and prolific writings. In Vernadsky (1946: 97; 1959: 63–64; 1968: 22) he persistently presumed that the origin of the ethnonym *Rus*, now consensually taken as Norse-Finnish in origin, was Iranic because Caucasian Scytho-Alans, ancestors of present-day Ossetes, numbered a clan known as Antes who merged sometime *c.* AD 800 with the *Rus*, whence Rus-Alan (Rokholani), an Alanic tribe who defeated the Scythians *c.* 200 BC, following which the former became known simply Rus, given the first half of the tribal name, and so Alanic *ruxs* 'radiant light' was the derivative for Rus or Ros (Russia, Russians). Frye (1946) and Clauson (1959) are rightly severe reviews detailing rectifications to the flawed application of oriental source evidence in Vernadsky 1946; 1959. Misleading conclusions as regards 'Uralic cognates' for the Scythian language are in Kuttner 1978: 225 but authoritatively examined in Schmitt 2018.

[18] Hambly 2005: 706; Tokhtas'ev 1992: 563–67 and Ivantchik 2018 are authoritative surveys; Cimmero-Scythian interactions are examined in Vogelsang 2008: 86; Baumer 2012: 224–28; Cunliffe 2015: 192–98. Narain 2013: 31 wrongly erases distinctions between Cimmerians and Scythian 'incomers' pointed out in Khazanov 2015: 33–36; Adali 2017, an exhaustive recent treatment, compels a rethink of Cimmerian–Scythian dynamics in the region with 'pre-existing power structures of the Ancient Near East'.

[19] Taishan 2014: 8, 10.

[20] Bailey 1977/78: 45; 1979*a*: 207; 1985*b*: 8–9, 67–68; Thordarson 1988: 537, n. 1; Bailey apud Frye 1993: 44, 60, n. 52; Windfuhr 2000: 19.

[21] Ball 2010: 101–105.

[22] Nikolaev and Pankova 2017.

[23] On Alans, Scythians and Sarmatians see Berndt 2018; Dickens 2018: 1334, 1346–47 respectively.

[24] Cunningham and Henson eds 1998.

[25] *Persika*, fragment 3; cited in Kuzmina 2007: 380.

[26] Schmitt 1991: 50, 56; Lecoq 1997: 188, 195.

[27] Bailey 1982: 8; Lecoq 1997: 228; Schmitt 2000: 61, 64, 93; Kuhrt 2007: II, 486.

[28] Lecoq 1997: 257; Schmitt 2000: 92–93; also listed in Susa empire list, DSe 26-27: Lecoq 1997: 232–33; Kuhrt 2007: II, 491; cited in Bailey 1970: 68; 1971*a*: 5; 1971*b*: 17–18; 1972: 100; Frye 1984: 103, n. 55; 1993: 45–46; Kuzmina 2007: 380; Mallory and Mair 2008: 107–108; Vogelsang 2008: 87; discussed as imperial representations and realities in Briant 2002: 172–83; Taishan 2014: 3; Benjamin 2018: 159.

between the Bactrians and Indians.[29] The latter are artistically evident along the eastern stairs of the Apadāna, Persepolis, *c.* 520–485 BC. But here Irān owes something to 'Irāq – or at least its Babylonians. At the northwest end in Nimrud of the palace of Aššurnāṣirpal II (885–889 BC) is a bas-relief depicting two shooting and galloping horsemen, trouser-clad with pointed caps and soft top boots.[30]

A mention of Parthians may well bring to mind their 'armoured cavalry' (Greek *katáphraktoi*) and the Parthian shot for they were 'adept at this than anyone else except the Scythians'.[31] But the Scythians were a long shot ahead. Credit where credit due: Clement of Alexandria (8.62) declared that 'both men and women of the Saka had bows and were able to shoot turning back when galloping a horse.'[32] But eventually the Parthians wielded the whip in shunting off the Sakas into southeast Irān henceforth *sakastāna* in Pahlavi sources or *drangiana* of Greek geographers (Old Persian *zranka*, Inscrp. Parthian *skstn*, Middle Persian *sīstān*, Christian Sogdian *sgst'n*, Greek *segistēnē*, Buddhist Sanskrit *śakasthāna*, Classical Armenian *sakastana*, Classical Chinese *wuyishanli*, New Persian *sistān*, Classical Arabic *sijistān*), Seistān va Baločistān, present-day Irān's largest province.[33] This is dateable between 120 and 80 BC because the Indo-Greeks collapsed at the hands of the Sakas. Parthia played its walk-on part in the destiny of the Sakas by preventing further tribal movements from upper Asia but not before losing two monarchs in battles, Phraates (*c.* 128 BC) and Artabanus II (*c.* 123 BC).[34] Only Mithradates II (*c.* 123–87 BC) was able to resume Iranian suzerainty in the east by which time the Sakas were temporarily ensconced in Sistān.[35]

A gripe in sources from the 2nd century BC permits one to sketch not confidently but cursorily. The eastern part of the Graeco-Bactrian kingdom north of the Hindu Kuš, particularly around the environs of Aï Khanum,[36] was annexed by nomads in 145–140 BC. In the first instance Scythians and second time around by the Yuezhi wave emerging from Gansu farther east in China. A Scythian runic inscription on a silver ingot gives away their presence during the initial invasion.[37] Indirect evidence comes from Chinese sources. Bactria (Chinese *daxia*), to be sure, was under the sway of the Sakas until 130 BC. The Yuezhi themselves were being pushed out west thanks to the Xiongnu onslaught.[38] This billiard ball effect of tribal waves into south central Asia, and eventually the northern rim of the subcontinent, need not detain us here. Briefly, the Sakas were ejected from Bactria by the Yuezhi who established themselves in north-central Afghānistān. They re-arranged it into five *yabghu* or sub-provinces, the third of which would stand out in history and attested in Chinese annals as the Guishuang/Kueizhuang or Kušāns.[39] It is entirely plausible that the Kušāns absorbed some of the Sakas into their confederation. Tellingly tantalising, this has been proposed in recent scholarship where we have now come to consider those interred at Tillya tepe with their Bactrian gold may not be Yuezhi-Kušān, as the late Véronique Schiltz had cautioned.[40] Her French compatriot, Claude Rapin, reminds us as well that the Tillya tepe burials,[41] containing a plethora of bronze mirrors and decorative plaques betraying Chinese links, demonstrates how this location was a waypoint 'between the steppe belt and Indo-Scythian world'.[42] The exact ethnic provenance of buried artefacts at Tillya tepe as that of Sakas, as previously suggested by the late Paul Bernard, is still to be determined.[43]

The Kušāns, at any rate, played a pivotal role in the eventual formation of the kingdom of Khotan before the 'Silk Road' opened in the latter part of the 2nd century BC. Indian Buddhism arrived at an Iranian, namely Kušān remove, in the Tarim Basin (modern Chinese *talimu pendi*) and therefrom China. Accompanying the Mahāyāna doctrine was its liturgical medium, Sanskrit and another distinct dialect of post-Aśokan, inscriptional northwest Prākrit or Gāndhārī for daily administration in the oasis towns of the southeast Tarim Basin during the 3rd century BC. Far removed from its Indian locale, it was an entirely different dialect of Gāndhārī known locally as Niyä or Kroräna Prākrit.[44] Sir Harold Bailey coined it Gāndhārī that was

[29] Schmitt 2004: 63–64.
[30] Kuzmina 2007: 380.
[31] Plutarch, *Lives*, *Crassus* 24; Clements 2017: 35; Benjamin 2018: 160.
[32] Cited in Kuzmina 2007: 380.
[33] Bailey 1958: 132; 1970: 68; 1978: 2; 1982: 8; 1983: 1230–31; 1985*b*: 66; Frye 1992: 166; Wolski 1993: 86–87; Frye 1996*a*: 444.
[34] Daffinà 1967 is an exhaustive monograph combing all classical sources on this movement. Junge 1939: 103; von Gabain 1961: 497–98; Bailey 1970: 68–69; Bivar 1969: 40; Frye 1984: 193–94; Taishan 1998: 2, 167–77 is a detailed examination of Chinese sources on the Sakastana-Wuyishanli kingdom; Higham 2004: 291; Wiesehöfer 2007: 111; Liu 2010: 22; Callieri 2016; Rezakhani 2017: 34–38; Benjamin 2018: 157–59.
[35] Herzfeld 1935: 8, 54; Frye 1984: 194; 1993: 206–207; Stavisky 1986: 118; Narain 1990: 158; 1998: 47; Benjamin 2007: 213; Wiesehöfer 2016: 5; Benjamin 2018: 160.
[36] Higham 2004: 29–30.
[37] Rapin 2007: 50.
[38] Enoki, Koshelenko and Haidary 1999: 175–76; Higham 2004: 390–92; Benjamin 2007: 89–90; Chakravarti 2016: 1290; Rezakhani 2017: 94–95.
[39] Bivar 1969: 38–40; Brentjes 1978: 193–94; Frye 1984: 250–51; 1993: 180–81, 185–87; 1996*c*: 456; Narain 1990: 159; 1998: 41–47; Posch 1995: 84–88 marshalls Chinese sources for a regional Bactrian history extensively; Enoki, Koshelenko and Haidary 1999: 185–86; Higham 2004: 189–91; Benjamin 2007 is the standard and most comprehensive treatment of their Tarim Basin *Urheimat* and forced *Volkerwanderung* to Bactria; Rapin 2007: 61; Mallory and Mair 2008: 95; Vogelsang 2008: 144–45; Liu 2010: 6–7, 15; Baumer 2014: 46–47; Hansen 2017: 110, n. 32; Rezakhani 2017: 49–55; Benjamin 2018: 181–83; Whitfield 2018: 57–63.
[40] Schiltz 1999: 71.
[41] Higham 2004: 349–51.
[42] Rapin 2007: 56–57.
[43] Contra Bivar 1983: 193–94; contra Frye 1996*b*: 455; Vogelsang 2008: 143; Callieri 2016; Benjamin 2018: 184; see also Francfort 2011; 2012.
[44] Sundermann 1996: 469; Higham 2004: 205–207, 309–11; Mallory and Mair 2008: 81–87, 278. Emmerick 1983*b*: 963; 1989: 134 notes that

written in the *kharoṣṭhī* script (Old Iranian *xšaθra-pištra* 'royal writing').[45]

Scholarly consensus contends that migrating Saka tribes migrated in the first half of the 2nd century BC to the Tarim Basin and settled on the southern edge of the Taklamakan Desert (modern Chinese *takelamagan shamo*).[46] Chinese history attests the presence of these Sakas from the 2nd century BC as ruling monarchs when Zhang Qian filed his report sometime after 140 BC for the (Western) Han emperor, Wudi concerning a possible alliance with the Yuezhi against the Xiongnu. From the 3rd century BC comes our earliest literary, indirect evidence of Iranians domiciled in Khotan because hitherto there is nothing to confirm their advent much less presence.[47] Later literary evidence comes from Khotanese, an eastern Middle Iranian language written in a southern Turkestan Brāhmī script.[48] Khotan was a centre of Mahāyāna Buddhism by the early 5th century BC.[49] The alleged introduction of Buddhism by 84 BC need not be dismissed out of hand.[50] What can be is the supposed Indian conquest of Khotan in the 3rd century BC notwithstanding the presence of Prākrit-speaking, Indian colonists along the burgeoning 'Silk Road' even before Buddhism's regional expansion.[51] But the foundation legends tracing Buddhism's advent in Khotan to the 3rd century BC, thanks to Aśoka's son Kuṇāla or some of his ministers, merits consideration,[52] as does the earliest local documentation of Khotan through a series of Sino-Kharoṣṭhī coins whose dating has been vexing but dateable in all probability before AD 260.[53]

An excursus now is in order to highlight that Khotanese texts, constituting the core of Khotan Saka studies and so readily available from the 8th to 10th centuries, were previously our earliest linguistic evidence of a fully vocalised Iranian language. This must be revised in light of my teacher Nicholas Sims-Williams's discovery and decipherment of the corpus of Bactrian legal documents.[54] Bactrian, like Khotanese, unlike Sogdian, Khwarezmian, Parthian or Pahlavi, is the only other vocalised Middle Iranian language. The earliest Bactrian documents, at the time of writing, are two purchase contracts of uncertain date and our oldest, extant, vocalised Middle Iranian samples.[55]

None of our Khotanese texts employ the demonym Saka to describe themselves although its traces are found in some documents from the 7th–10th centuries.[56] The indigenous name for the people in Old Khotanese was *hvatana-*; their land was *hvatana-kṣīra* (Old Khotanese *hvatäna-*, Late Khotanese *hvaṃna-*, *hvana-*, *hvaṃ-*, Niyä Prākrit *khotana*, Sogdian γwδnyk); and '[language] of Khotan' (*hvatanau*, *hvaṃno*, *hvatano* formed from *hvatäna-* plus adj. suffix *-aa-* < *-aka-*), Bailey.[57] It may well be a self-reference from *hvata* 'self' connoting '[rulers] themselves' (cf. Avestan *xvatō*, Zoroastrian/Book Pahlavī *xvat*), an unconscious acknowledgment of 'the Saka people who settled in Khotan before their record begins in the 2nd century BC in Chinese reports'.[58] A throwback to this peripatetic past and its spiritedness can be glimpsed when reading how the Chinese pilgrim Songyun (?–AD 528), sojourning through Khotan in the early 6th century, noticed Khotanese women wore girdles, vests and trousers, and regularly rode on horseback.[59] The Tibetans referred to Khotan as *li-yul* 'li land' whose etymology remains unexplained.[60] A *Volksetymologie* ascribes the name for Khotan to Old Indian *gostana* lit. 'earth-breast' (Buddhist Sanskrit *gostana-deśa*, Khotanese *gaustaṃ*, Tibetan *sa-nu*), allusions to that Aśokan legend of a banished son whose ministers witnessed the earth rise in the form of a breast at the very location Khotan was established. Xuanzang gave

Khotan must have initially been following Hīnayāna Buddhism as its Sarvāstivādin variant was prevalent across most of central Asia and only later the Mahāyāna sect became popular.

[45] Bailey 1946: 764–97; 1972: 103; 1982: 64–65; Emmerick 2001: 34; Higham 2004: 182.

[46] Bailey 1970: 68; 1971*b*: 18; 1982: 3; Emmerick 1983*a*: 263; 1992: 2; 2012: 377; Russell 1983: 684; Frye and Litvinsky 1996: 461; Sundermann 1996: 470; Skjærvø 2004: 34; Mallory and Mair 2008: 315; Kumamoto 2009; Baumer 2014: 138; Walter 2014: 31. The dates are inconclusive and range across the 3rd–2nd centuries BC with recent scholarship preferring an earlier date.

[47] Bailey 1979*b*: viii; Emmerick 1979 [1983]: 168, n. 7 for references to the Endere Kharoṣṭhī document 661 mentioning *khotana maharaya rayatiraya* 'of the great king of Khotan' and commonly presumed as that of the 3rd century thereby leading one to surmise that titles, namely, 'the use of Iranian terms such as *hīnāysa-* and *kṣuṇa-* points to an established connection between the Iranian inhabitants and royal power'; Emmerick 1983*a*: 265; 1992: 2; Skjærvø 1987: 784; 2003: lxv; Mair and Skjærvø 1992: 465; Tremblay 2007: 99; Kumamoto 2009.

[48] Bailey 1958: 136–37; Emmerick 1979 [1983]: 168; 1992: 7 notes a 10th-century document addressed to the court of Khotan; Maggi 2009: 334–35.

[49] Sundermann 1996: 470; Nattier 2004: 121; Uwe-Hartmann 2005: 1146; Maggi 2009: 341; Whitfield 2018: 144–45. Walter 2014: 32 notes that Tantric Buddhism was on the ascent from the 7th century onwards in Khotan.

[50] Emmerick 1983*b*: 952; 1989: 133; 1992: 3; Sundermann 1996: 470.

[51] Bailey 1982: 43; Emmerick 1990: 492; 1992: 3; Mallory and Mair 2008: 300.

[52] Skjærvø 1987: 783; 2004: 34; Emmerick 1979 [1983]: 167; 1983*b*: 951; 1992: 1–2.

[53] Cribb (1985: 145) estimated that the coins range from *c*. AD 1 to *c*. AD 130 and must be acknowledged for conclusively adducing evidence of Kušān authority over Khotan in the 1st century AD; summarised in Wang 2004: 37–38; Kumamoto 2009; Hansen 2017: 341; Benjamin 2018: 286.

[54] Sims-Williams 2000 [2001]-2012.

[55] Sims-Williams and de Blois (2018: 82), per their computation of the Bactrian era, posit ranging both of these undated, purchase contracts in fragmentary state (DOCS aa, ab) to AD 312–380. A well-preserved, complete and dateable polyandrous marriage contract (DOC A) is now known to have been written and notarised on 13th October 332. Our western Middle Iranian (Parthian) evidence is doubtless older but unvocalised, namely that Awrōmān land sale deed and those 2,500-plus formulaic ostraca of wine receipts from Nisā (2nd–1st centuries BC).

[56] Bailey 1958: 132; Emmerick 1968: 2.

[57] Bailey 1958: 131; 1983: 1232.

[58] Bailey 1982: 3.

[59] Mallory and Mair 2008: 79; Whitfield 2018: 142.

[60] Emmerick 1979 [1983]: 167; 1983*a*: 263 on the Tibetan text, *Li yul luṅ-bstan-pa*, one of four foundation texts sourced to describe the origins of Khotan; Skjærvø 2003: lxvi; 2012: 109; Kumamoto 2009.

the country's official name as *kustana* 'earth-breast', which was neither in currency among the Khotanese or the Chinese (earliest attestation *yuzhi*, classical Chinese *yutian*, Modern Chinese *hetian*).[61]

Khotan, for the Chinese more so than Buddhism, conjures jade.[62] It was a reputed centre for abundant jade stone as depicted in the official dynastic compilation, *Hanshu* or 'History of the Former Han' (206 BC–AD 8).[63] One recalls that the jade road was older than the silk one.[64] Khotan was *the* centre of silk production in the Tarim Basin and Sir Marc Aurel Stein opined that Khotan, not China, was the real Serindia ancient geographers had in mind.[65] And jade, like gold, conjures images of Sakan wealth.[66] Khotan was blessed with a superb supply of authentic jade, real nephrite, as the town was between the flowing Yöröng Kāsh ('white jade') and Qara qāsh ('black jade') streams flowing from the Qurum (Kunlun) mountains.[67] The river was known in Khotanese as *ranījai ttāja,* 'river of precious stone';[68] the Khotanese *ira* 'jade' here substituted with the prestigious Indian lexeme *rana-* < older *ratna-*.

Khotan was strategically positioned on the edge of the Täklamakan, with vast distances between oases to the east such as Niyä,[69] and the only feasible route westward wound out of Xinjiang. Throughout the 1st millennium, down to the eventual collapse of the kingdom, it changed hands among Tibetan, Turkish and T'ang contenders. Khotan's shaky Tibetan interregnum covered two decades (AD 670–90).[70] The Chinese routinely subjugated or manipulated, as was their meddlesome wont, in the politics of all 'Silk Road' statelets or Western Regions, a practice prevalent down to the present. No mention of Khotan occurs in Chinese documents of the 9th century but our sources pick up a century later. A protracted struggle between Khotan and Qäsqär,[71] at the western edge of the Täklamakan and terminus of the northern and southern 'Silk Road' tiers, was the beginning of the end. For taking advantage of this distraction, Khotan's last Buddhist ruler fell to the Qaräkhanid Türks after a 24-year campaign despite being aided by Tibetan and Buddhist Uyğur allies. By 1006, a certain Yūsuf Qadïr Khān had assumed the mantle and three years later, in 1009, Khotan was despatching tribute to the Chinese court under the name of a 'black khān' (Chinese *heihanwang*).[72]

Firdausi, by 1010, was completing his Persian epic, the *Shāhnāma* 'Book of Kings', based on a now lost redaction of the Sasanian *Khwadāy-nāmag* 'Book of Lords'. Firdausī, when appropriating the heritage of Parthian minstrelsy and semi-legendary history in his national narrative, did not omit that Iranian Herakles, the very personification of Saka valour, 'a Saka hero, not a hero of the indigenous pre-Saka population of Seistan',[73] but that 'Saka hero of the *Shāh-nāme*, Rostam, who, rather than any king, is in many respects the real hero of the "Book of Kings"'[74]: Rustam (Old Iranian **rautastakhma*-Zoroastrian/Book Pahlavī *rōtastakhma* [apud Bailey]; Old Iranian **raudhastakhma*-, Zoroastrian/Book Pahlavī *rōdstakhm* [apud Christensen] 'mighty in bodily strength'), or Rustam the Sakan (New Persian *rustam-i sagzī*, Armenian *ṙostom sagčik*).[75] Eight centuries later, in 1853, Matthew Arnold would recount him and his ill-fated son in *Sohrab and Rustum*.[76]

In 1897, the *Journal of the Royal Asiatic Society of Bengal* (vol. 66) carried an extra number issue wherein

[61] 'Cow-breast' apud Bailey 1982: 2–3; Emmerick 1983*a*: 266; 1990: 492; Skjærvø 1987: 784 details this legend and alternate versions at length; Mair and Skjærvø 1992: 465; Mallory and Mair 2008: 77–81; Skjærvø 2004: 34; 2012: 109.

[62] Wood 2003: 26–28; Michaelson 2004: 43–49; Higham 2004: 143; Skjærvø 2009; Hansen 2017: 435–36; Whitfield 2018: 25–28.

[63] Baumer 2014: 138.

[64] Mallory and Mair 2008: 78.

[65] Wood 2003: 43.

[66] Whitfield 2018: 141.

[67] Emmerick 1992: 1; Hansen 2017: 346; Whitfield 2018: 138.

[68] Bailey 1982: 1.

[69] Higham 2004: 242–44; Whitfield 2018: 139.

[70] Hinüber 1991: 102; Skjærvø 1991: 256; Mallory and Mair 2008: 80–81; Whitfield 2018: 142–43.

[71] Higham 2004: 179–80; Mallory and Mair 2008: 69–71.

[72] Samolin 1964: 80–82; Barthold 1977: 273, 281, n. 2; 1987: 969–70; Bailey 1982: 3; Hinüber 1991: 107; Skjærvø 2003: lxv; 2004: 41; Kumamoto 2009; DeWeese 2011: 725; Xinjiang 2013: 131–32; Baumer 2014: 138; Walter 2014: 33; Hansen 2017: 368–70; Tao 2017: 124–26; Whitfield 2018: 144.

[73] Boyce 1955: 475.

[74] Russell 2004: 543.

[75] Bailey 1970: 69; 1971*b*: 19; 1976*a*: 8; 1978: 5; 1983: 1231–32; 1985*b*: 66; Alishan 1989: 17–23; Frye 1993: 219; Schwartz apud Davidson 2013: 105, n. 26 alternately proposed deriving it from Avestan **raotas-taxma* 'having the strength of a stream'. Yarshater (1983: 454–56) is the best synopsis which must be consulted for Elamite attestations of his name (*rašdama*, *rašdakma* < **rastu-taxma*), suggested by Ilya Gershevitch (Yarshater 1983: 456, n. 3); and, more importantly, highlighting how Nöldeke (1930: 13–14) was the first to propose that 'Rustam and Zal are localized most decidedly in Sistan (Drangiana) and Zābul (Arachosia)' and the Sistānī-Sakan origins of Rustam. Melikian-Chirvani (1998 [2001]: 190, 198 n. 117) proposed that Helleno-Scythian art is where one discerns the 'earliest representation of Herakles [= Rustam] found among the communities speaking Iranian languages'. See therein his evidential reference to the *Scythian Gold* catalogue edited by Ellen Reeder *et al.* which accompanied the exhibition of Ukrainian gold objects mounted at San Antonio Museum of Art, San Antonio; LACMA, Los Angeles; Nelson-Atkins Museum of Art, Kansas City; Walters Art Gallery, Baltimore; Brooklyn Museum of Art, New York; and the Grand Palais, Paris (November 2000–December 2001). Bivar (1983: 195) alerted one to the possibilities of parallels in Saka funereal tradition and the role of the horse with that of Rustam's last rites in the *Shāhnāma*.

[76] Pound 1906; Giles 1910; Javadi 2003 is a fulsome native assessment in recent Persian literature. A perceptive piece, Allott (1973), correctly attempts at dispelling Arnold's 'Scythian' in 'The Strayed Reveller' (line 162) as one for he could not have had those Scythians of Aeschylus, Pindar and Herodotus in mind when composing this verse when deploying 'what is now a confusing obsolete sense'. On Arnold's citing of Gibbon who too uses a loose descriptor, see *supra* Womersley ed. 2005: 1025, and Allott 1973: 164, n. 2, who contends Arnold was probably thinking of either Alans or Cumans.

Augustus Frederic Rudolph Hoernle (1841–1918), principal of the *Calcutta Madrassah,* published an article concerning an 'unknown language' which puzzled him after having come to his attention and described, in his November 1905 report to the Under Secretary to the Government of India, as 'seem to prove clearly that the language of the documents is an Indo-Iranian dialect.' Hoernle would become the decipherer of Khotanese.[77]

His Persianist successor and principal of the *Calcutta Madrassah*, Sir E. Denison Ross, returned to England becoming the first director of the School of Oriental Studies (now SOAS) established a century ago in 1916.[78] One of Ross's earliest appointees, Harold Walter Bailey, the Parsee Community Lecturer in Iranian Studies (1929–36), upon subsequent translation to Cambridge as Professor of Sanskrit (1936–67), would take up where Hoernle left off devoting a lifetime's industry towards translating these Khotanese documents which Sir Aurel Stein collected during three of his four expeditions to central Asia (1900–1901, 1906–1908, 1913–16).[79] This entire tranche was deposited at the British Museum's Department of Oriental Printed Books and Manuscripts and remained there until the British Library was constituted in 1973.

A milestone in Iranistics was reached when Sir Harold Bailey published his *Dictionary of Khotan Saka*.[80] The Sakas verily went *para darya* 'beyond the sea' when, to commemorate its publication, an *opus* planned 'in 1934, forty-four years ago, to make available to Iranisants all Iranian material ... concerned with the one Saka dialect of North Iranian of which Ossetic (Arsia) in the Caucasus and Wakhī in Wakhān in the Pamirs are other branches',[81] Columbia University's Centre for Iranian Studies invited Sir Harold to deliver a week-long series of lectures eventually published as the *Culture of the Sakas in Ancient Iranian Khotan*.[82]

His seventh volume on *Khotanese Texts* appeared a decade before his demise.[83] The Khotanese Stein collection of approximately 50 scrolls, 2,000 paper fragments and 100 woodslips, under the aegis of the *Corpus Inscriptionum Iranicarum*, was authoritatively deciphered, and translated by P. Oktor Skjærvø, as *Khotanese Manuscripts from Chinese Turkestan in The British Library*, 2002.[84] It was fitting what that recently deceased Indologist, Awadh Kishore Narain, stated when commissioned by *The Cambridge History* series towards the end of the previous century: 'The variety of linguistic remains in the Saka language provides what amounts to a veritable index to the high civilization of the Sakas in Inner Asia.'[85]

[77] Although A.F.R. Hoernle was its discoverer, Emmerick (1992: 6) points out that J. Kirste was the designator when he proposed the expression 'khotanisch' in his published 1912 article; Wood (2003: 192–93); Skjærvø (2003: xxvi, xxxviii–xlvii, lxix); Sims-Williams (2004: 418–20) is an authoritative survey of Hoernle; Maggi 2009: 331; Hansen 2017: 348–49.

[78] Ross 1943: 168.

[79] Skjærvø 2003: xlvii–xlix.

[80] Bailey 1979*b*.

[81] Bailey 1979*b*: vii.

[82] Bailey 1982; cf. Emmerick 2001: 44; 2002: 10. Also see foreword by Ehsan Yarshater, sponsor and organiser of the *Columbia Lectures in Iranian Studies* (Bailey 1982: vii). Russell (1983: 679–80), an *alumnus* and then lecturer at his *alma mater*, recalled these Columbia lectures in October 1979, the maiden in this series, 'delivered over five consecutive days, with one hour allotted to each lecture; the latter, in fact, never lasted less than two hours, and at the end of each Prof. Bailey fielded questions from his weary and bedazzled listeners, without himself showing the slightest sign of fatigue. But for the firmness of the Columbia janitors and the departure of the audience, the lectures might have been thrice their present length. Asked by one listener for a concise statement of the general importance of Khotanese studies to the field of history in general, Bailey suggested that here was a civilization whose language proved that, long before central Asia was Muslim or Turkic, great Iranian cultures thrived across its vast expanses.' Bailey published extensively also on Ossetic (Sims-Williams and Hewitt 1997: 113; Emmerick 2001: 35; Sheldon 2002), a descendant of northeast Iranian or Scytho-Sarmatian dialects: Old Ossetic (Alanic) was spoken by the Alans, Sarmatian nomadic pastoralists, closely related to Scythians and also of Iranic stock, who migrated from central Asia to the Urals between the 6th and 4th centuries BC. Ossetic is, geographically, the westernmost of east Iranian languages spoken across the central Caucasus covering Georgia including the south Ossetia/Tskhinvali autonomous region and north Ossetia/Alania within today's Russian federation. Ossetic is the sole surviving remnant of the Scytho-Sarmatian dialect group and actually the only Iranian language native to Europe. Bailey was known to have compiled his rhyming diaries into an epic running some 3,000 verses 'in a private language concocted from classical Sarmatian inscriptions', Rush (1996: 12). Also recalled by my senior SOAS colleague, Prof. B. George Hewitt, to whom I owe a copy of his transcript, 'Reminiscences of Sir Harold', read at his funeral service, 19th January 1996. He also lectured in both Ossetian dialects, Digoron and Iron, to his suitably impressed hosts during a visit to Soviet Georgia in 1966 (Bivar 1996: 408; Rush 1996: 12). Gershevitch (2002: 294), Bailey's fellow Iranist colleague at Cambridge, recalled working on Ossetic with him when a native informant, Barasbi Baytugan, was employed as a lecturer in that language in 1948. Baytugan years later would fondly remember Bailey, 'the world's sole master of the long-forgotten Saka cousin of his mother tongue [and] referred to him as "the father of the Ossetic people"'.

[83] Bailey 1985*b*.

[84] Bailey 1968; also published by the *Corpus Inscriptionum Iranicarum* (CII), was a pioneering forerunner to this edition. Skjærvø (2003) jointly published by the CII and The British Library. This corrected imprint is now out of stock. The first edition, Skjærvø (2002) with *corrigenda* slips, as well as Bailey (1968) are available for sale from the School of Oriental and African Studies (SOAS) Library, London.

[85] Narain 1990: 174.

‘Steppe Style’ in southeast Gansu province (China) in the 4th and 3rd centuries BC

Raphael Wong[1]

Abstract

Scythian-type steppe culture impacted on China to a greater extent than previously recognised and evidence for this comes from recently excavated elite tombs at Majiayuan in southeast Gansu province. Among the finds from these are chariots which show close parallels in their decoration with the carriage and textiles found at Pazyryk in the Altai region of southern Siberia, suggesting contact between the respective elites. These influences continued even into the reign of the First Emperor of China judging by further similarities in his wheeled vehicles and palace decoration.

Keywords: Majiayuan; pastoralism; chariot; carpet; Eurasian steppe; Pazyryk; Scytho-Siberian; Achaemenid; Assyria; Qin empire

Introduction

This paper examines the material culture of the elite among a pastoralist group active in modern China’s southeast Gansu province in the 4th and 3rd centuries BC. This group is sometimes associated with a group mentioned in Chinese historical chronicles, including the *Shiji* [*Records of the Grand Historian*], and called the *Xi Rong*, i.e. Western Rong. Their cemeteries have been discovered throughout the steppe environment of Gansu and several have been excavated, mostly since 2006.[2] So far, six cemeteries consisting over 200 graves have been found in Tianshui and Dingxi cities.[3] These mainly contain catacomb tombs consisting of a vertical pit and a lateral chamber. The deceased were buried with the skulls and hooves of cattle, sheep and/or goats, gold ornaments in ‘Animal Style’, iron weapons, horse fittings, pottery vessels, various sets of ritual bronzes in the same styles as those found in the Central Plain, and large numbers of elaborately decorated chariots.

The sites have generally been overlooked by steppe archaeologists, possibly because of their locations, which are peripheral to the steppe zone, nor have they received much attention from Chinese archaeologists whose attention focuses mainly on the tombs of the Chinese Warring States elite. In fact, these tombs are of great importance to our understanding of Scythian-type culture in southern Siberia, because they demonstrate its reach far south of Inner Asia and extending into eastern Asia. To illustrate the cultural contact between the two regions, this paper will focus on the link between the chariots excavated at Majiayuan in Gansu and a contemporary carriage from Pazyryk in the Altai region of southern Siberia. It will also show the significant impact of pastoralist culture on the First Emperor of China, Qin Shihuangdi, who reigned from 221–210 BC, by examining his own vehicles and palaces.

Geography of Asia

Before going into the study of the chariots at Majiayuan, it is helpful to examine the geography of the research region. This covers modern western Asia, China and southern Siberia in Russia, linked by a steppe belt constituted of grasslands and forests, and it has been home to different groups of people. There were mountains; however, these never acted as barriers to the movements of humans and goods (Figure 1). Economic and material differences between mobile herders inhabiting southern Siberia and farmers living in western Asia and China’s central plain stimulated contact between these two groups. This is shown by coriander seeds originating from central and western Asia and central plain-style silk, mirrors and lacquerware which were found together in the 4th to 3rd century BC ‘frozen tombs’ at Pazyryk in the Altai mountains, to which we shall return.[4] The Majiayuan cemetery discussed in this paper is situated at the eastern section of the steppe belt in the Chinese province of Gansu, which is close to the province of Shaanxi, where the capital of the Qin dynasty and the mausoleum of the First Emperor of Qin are located. Other related sites, like 4th to 3rd century BC Issyk and 1st century AD Tillya Tepe, are also located

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[2] A number of researchers have shown that the area where the tombs are situated had a steppe character during the 1st millennium BC: see Li, Li and Shui 1993; Wang and Xu 1988.

[3] For the excavation reports and monographs on the tombs, see Gansu Sheng Wenwu Kaogu Yanjiusuo 2012; 2014; 2017; Gansu Sheng Wenwu Kaogu Yanjiusuo and Shaanxi Sheng Wenwu Kaogu Yanjiuyuan 2013; Gansu Sheng Wenwu Kaogu Yanjiusuo and Qingshui Xian Bowuguan 2014; Gansu Sheng Wenwu Kaogu Yanjiusuo and Zhangjiachuan Huizu Zizhixian Bowuguan 2008; Yang and Mao 2015; Zaoqi Qin Wenhua Lianhe Kaogudui and Zhangjiachuan Huizu Zizhixian Bowuguan 2009; 2010; 2012.

[4] Rudenko 1970: 76–77; Bunker 1991.

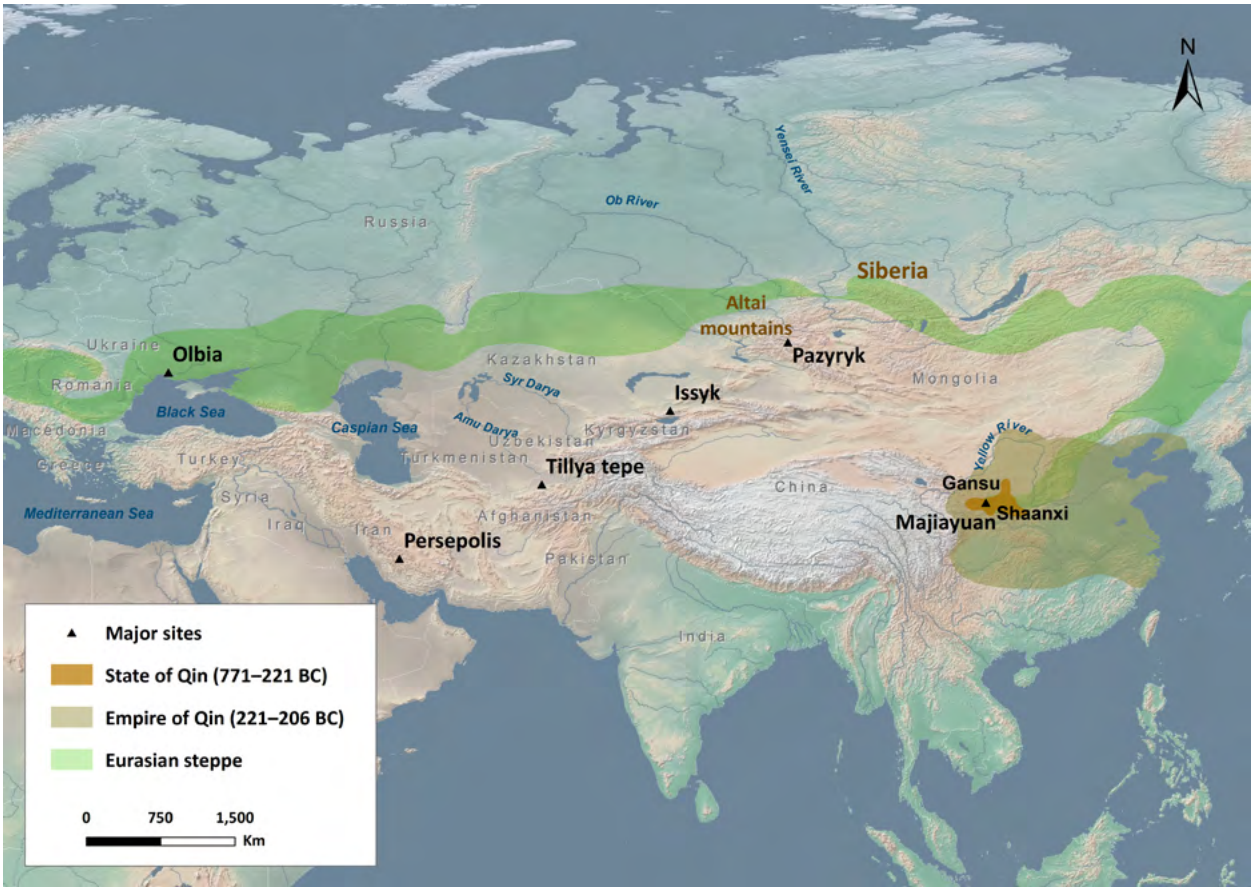

Figure 1. The Eurasian steppe and archaeological sites discussed in this paper (drawing by Raphael Wong)

in the research region and they show influences not only from westerm Asia and Greece but also the steppe.[5]

Literature review

A connection between the people at Majiayuan and in the Eurasian steppe has been noted previously by some scholars. Jenny So and Jessica Rawson, for example, have observed that the gold ornaments at Majiayuan resemble those of steppe leaders in aspects of both style and manufacturing technique.[6] One example is a gold pectoral from Tomb 16, which belongs to steppe traditions.[7] Another is a silver pectoral from a contemporary cemetery in Gansu, which has gold animal decoration similar to the gilded torc from kurgan 2 at Pazyryk.[8] There is also evidence of Hellenistic influence, most likely as a result of the Asian campaign of Alexander the Great (r. 336–323 BC) and the spread of Hellenistic culture through central Asia.[9] For example, a newly-published gold headdress with a beaded net from Tomb 4 at Majiayuan is similar to gold hairnets and pendants more common in the Hellenistic world.[10] Jessica Rawson has also argued that the personal weapons buried with the elite at Majiayuan shows that they fought hand-to-hand in the same manner as steppe warriors.[11] More recently, Liu Yuyang and Wang Hui have pointed out that the burial of hooves and crania of domesticated animals at Majiayuan parallel a regional funerary practice which prevailed between southern Siberia and the Chinese central plain.[12]

The Majiayuan chariots

The ornate chariots at Majiayuan have no precedents in southeast Gansu or its adjacent areas. They are made of wood and adorned with lacquer and ornaments in gold, silver, bronze, tin and faience. The side panels of the chariot boxes are decorated with openwork plaques with floral motifs arranged in a grid layout and with bosses at the grid intersections. The compositions are surrounded by animal-shaped plaques, faience beads or

[5] Akishev 1978; Sarianidi 1985; 1989; the topic of connections between Issyk, Pazyryk, Majiayuan and Tillya Tepe is beyond the scope of the present study and worthy of a separate paper but see Francfort 2012.
[6] So 2014: 198–202; Rawson 2018: 113-14.
[7] See Rawson 2018: 14 for gold neck ornaments recovered from the steppe.
[8] Rudenko 1970: fig. 50, pls 68d–e; Gansu Sheng Wenwu Kaogu Yanjiusuo and Qingshui Xian Bowuguan 2014: pl. 142.
[9] Bosworth 1988; Richard 2004; Holt 2005.
[10] Kaltsas and Giannakopoulou 2007: 358; Huang *et al.* 2016: fig. 5. I am grateful to Betty Lo and Kenneth Chu for pointing out the gold headdress from Majiayuan may have been inspired by Hellenistic hair ornaments.
[11] Rawson 2015: 63.
[12] Liu and Wang 2017.

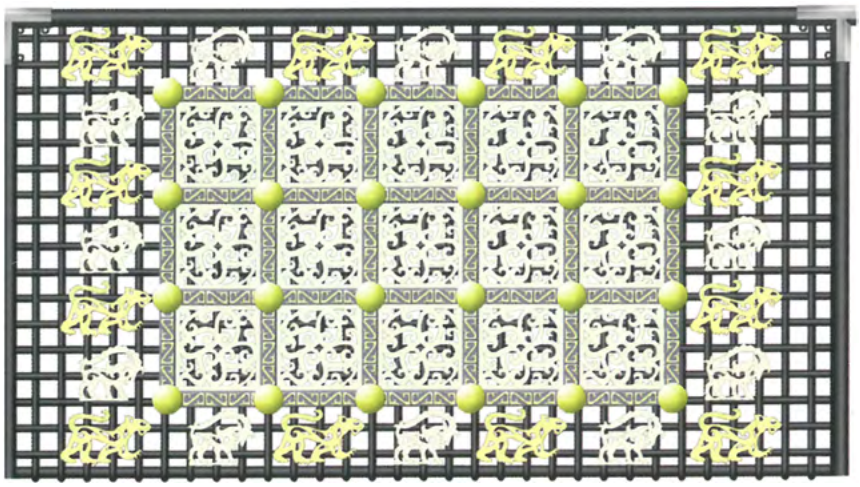

Figure 2. Drawing of a side panel from the passenger box of a chariot from Tomb 16, Majiayuan, Gansu province, China, 4th–3rd century BC; wood with an iron grid inlaid with gold, gilt bronze bosses, silver sheets with openwork scrolls, and gold and silver animal cutouts, 60 x 86 cm (after Zhao 2010*b*: fig. 2)

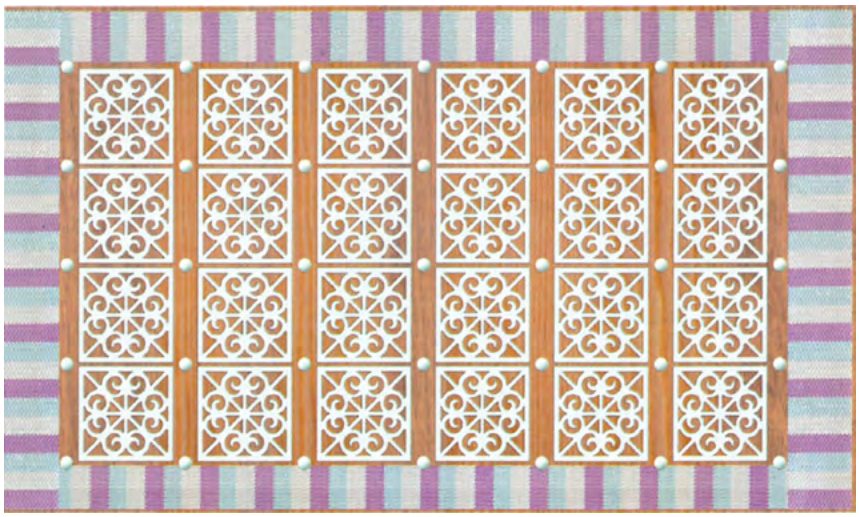

Figure 3. Drawing of a side panel from the passenger box of a chariot from Tomb 13, Majiayuan, Gansu province, China, 4th–3rd century BC; wood with bronze plaques with openwork scrolls, bronze bosses, and beads, 70 x 130 cm (after Zhao 2010*b*: fig. 3)

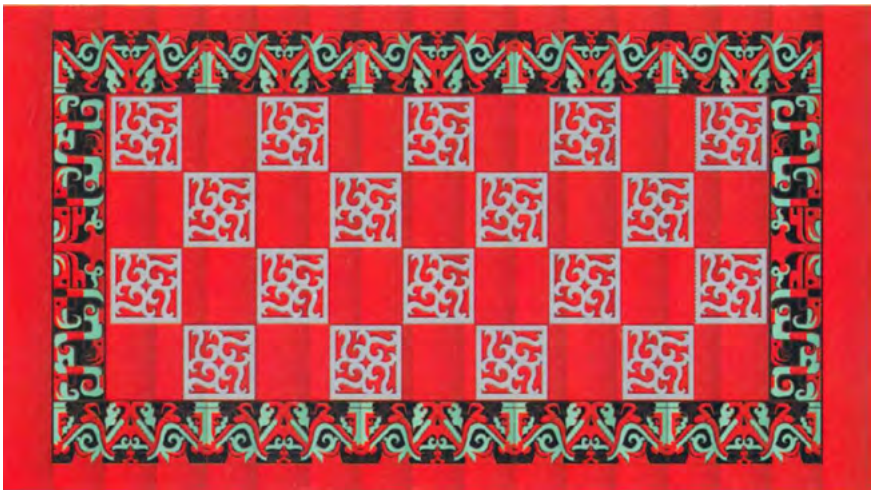

Figure 4. Drawing of a side panel from the passenger box of a chariot excavated from Tomb 16, Majiayuan, Gansu province, China, 4th–3rd century BC; wood with bronze plaques with openwork scrolls, and painted bird head and foliate border, 80 x 110 cm (after Zhao 2010*b*: fig. 6)

painted borders of birds and foliate scrolls (Figures 2–4). Sometimes the animal plaques are placed upside down as if they were not meant to be viewed horizontally.[13] The chariot wheels are decorated with geometric and animal-shaped plaques (Figures 5–6), while the draught poles are embellished with similar cut-outs and small bird figures (Figure 7). The chariots are thought to be a type of Qin vehicle called the '*Jinjin che*' or 'golden chariots' mentioned in Chinese historical texts.[14] In fact, the prototype of the chariots can be found in the Altai mountains, which in turn were inspired by royal chariots of the Achaemenid empire.

[13] Gansu Sheng Wenwu Kaogu Yanjiusuo 2014: fig. 14. Scholars including Wang Hui, Yang Jinhua, Kathryn Linduff and Wu Xiaolong have written about the chariot decoration, focusing on selected ornaments; see also Wang 2009; Wu 2013; Yang and Linduff 2013.

[14] Zhao 2010*a*: 81.

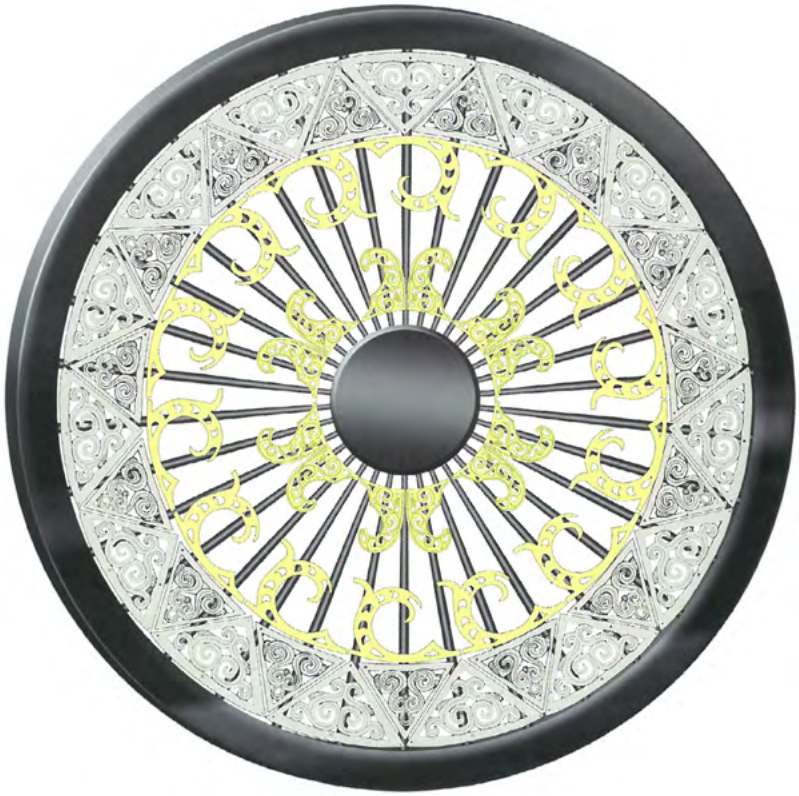

Figure 5. Drawing of a chariot wheel excavated from Tomb 3, Majiayuan, Gansu province, China, 4th–3rd century BC; wood with triangular silver sheets with openwork scrolls, and gold bird-head cutouts, diameter 140 cm (after Zhao 2010*b*: fig. 17)

Figure 6. Passenger box and wheel of a chariot with decorative plaques in situ excavated from Tomb 21, Majiayuan, Gansu province, China, 4th–3rd century BC; wood with bronze plaques, side panel: 42 x 95 cm, wheel: 110 cm (after Zaoqi Qin Wenhua Lianhe Kaogudui and Zhangjiachuan Huizu Zizhixian Bowuguan 2012: fig. 44)

The Pazyryk carriage and its prototype

Chariots were important status symbols in the Achaemenid empire, as they had been in earlier periods.[15] Representations of royal chariots are found on the reliefs on the northern and eastern stairway facades of the great audience hall or Apadana at Persepolis in southern Iran (Figure 8). Among the reliefs on these are representations of various groups of pastoralists paying tribute to the king. The vehicles are found in a procession of Susian guards and grooms of king Darius I (r. 522–486 BC). The side panel of one of the chariots is marked with a diagonal grid whose interlinking lines are joined by circles: on three of the four sides are striding lions, some facing upwards. The overall design of the panel is comparable to that of a representation of a slip-cover on a king's throne.[16] The slip-cover is occupied by square frames enhanced by

[15] E.g., Trimm 2017: 202–27.

[16] For a drawing of the slip-cover see Koch 2001: fig. 108.

Figure 7. Reconstruction of a chariot with iron bird figures on the draught pole excavated from Majiayuan, Gansu province, China, 4th–3rd century BC; materials and dimensions unknown (photograph: Anthony Huan)

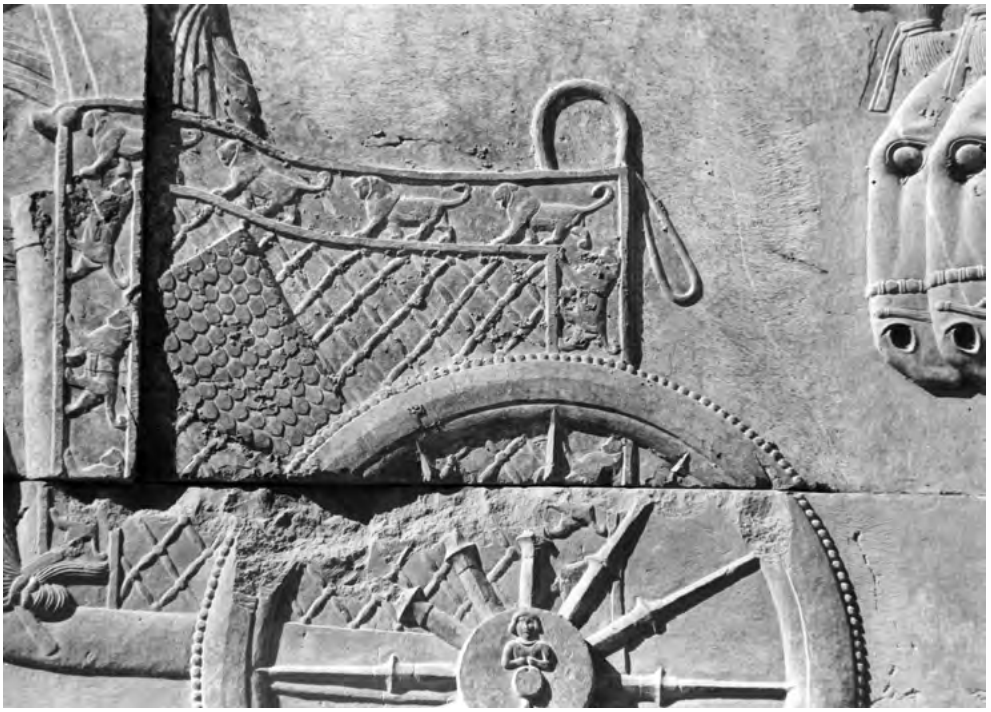

Figure 8. Limestone relief of a royal chariot in the Achaemenid Apadana, Persepolis, Iran, 6th–4th century BC (The Oriental Institute, The University of Chicago, P. 29464) (courtesy of the Oriental Institute of the University of Chicago)

triangles and filled with floral motifs. The frames are surrounded by further floral motifs framed by circles, some of which fall on the intersections. On three of the four sides, lions are walking in different directions. The design in turn has its prototype on stone door-sills used in the 8th and 7th century BC Assyrian royal residences. One such door-sill, from the North Palace of Ashurbanipal at Nineveh in present-day Iraq, has rows of square frames with octagonal plant motifs which can also be seen on a pile carpet which we will see later (Figure 9). The squares are surrounded by rosettes, some of which are positioned at the intersections of the square frames. The border is formed by rows of different kinds of plants, including arcaded lotus flowers and buds. It is possible that the royal chariot was adorned with either a decorative representation of a carpet or even an actual carpet which was intended to be viewed flat on the ground.

A steppe carriage comparable to this royal chariot was found in one of the kurgans at Pazyryk. Many scholars have noted central Asian influence on the Pazyryk material culture assemblages. For instance, Sören Stark has pointed out that the leather saddle arch facings

Figure 9. Part of a gypsum door-sill excavated from the North Palace, Room 1, Door C, Kuyunjik (Nineveh), Iraq, 645 BC; 246 x 305 cm (The British Museum, inv. nr. 1856,0909.57 / 124962) (reproduced by courtesy of the Trustees of the British Museum)

Figure 10. Pile carpet excavated from kurgan 5, Pazyryk, Russia, 4th–3rd century BC; wool, 200 x 189 cm

Figure 10a. Detail of the pile carpet in Figure 10

from kurgan 5 bear the Achaemenid motif of a winged sun disc symbolising royalty or divinity.[17] A wooden carriage was found in the same tomb, alongside a felt canopy cover with figures of cranes, and a pile carpet which might have been made in central Asia and used with the carriage.[18] Similar to the Achaemenid slip-cover, the polychrome carpet is decorated with square frames with stylised octagonal floral motifs, which are themselves surrounded by real and fantastic animals and horsemen. The square and larger frames are enhanced with coloured dots, paralleling the triangles on the slip-cover (Figures 10–10a). The riding horses buried in the same tomb wore saddlecloths with similar designs. The saddlecloths are made from blankets and cutouts of felt, and one bears a grid arranged in a diamond formation and joined by circles, like the decoration of the royal chariot. Along the border are silhouettes of bird-heads in profile, with the neck of each stretching towards that in front (Figure 11).

Figure 11. Saddlecloth excavated in kurgan 5, Pazyryk, Russia, 4th–3rd century BC; felt, 223 x 66 cm (after Rudenko 1970: col. pl. 262)

The overall decorative scheme of the Majiayuan chariots is similar to that of the Pazyryk carriage and mounts. In addition to the central grids and animal borders, the faience beaded borders parallel the coloured dot frames on the carpet. The animal plaques on the chariot wheels also match the animal borders of the textiles. When the chariot was moving, the ibexes on the wheels would have appeared to be running. If we look closely, we can even see broken repoussé lines on the silver plaques which imitate stitching (Figures 12–12a). The openwork cutouts and bird figures

Figure 12. Part of the decoration from the passenger box of a chariot excavated from Tomb 3, Majiayuan, Gansu province, China, 4th–3rd century BC; iron grid with gold inlay, gilt bronze bosses, and silver sheets, 64 x 30 cm (photograph: Anthony Huan)

Figure 12a. Details of the square sheets showing broken repoussé lines (photograph: Anthony Huan)

[17] Stark 2012: 121.

[18] For the central Asian origin of the carpet see Rudenko 1970: 303–304; Böhmer and Thompson 1991; for the description and illustration of the carriage see Rudenko 1970: 189–93, pl. 131.

Figure 13. Wooden cheek piece with bird-head terminals excavated from kurgan 2, Pazyryk, Russia, 4th–3rd century BC (after Rudenko 1970: fig. 94B)

Figure 14. Cheek piece with bird-head terminals excavated from Majiayuan, Gansu province, China, 4th–3rd century BC; iron with gold inlay, 25.3 x 5 cm (after Gansu Sheng Wenwu Kaogu Yanjiusuo 2014: 208–209)

attached to the draught poles also have parallels on the saddle straps from Pazyryk.[19] In addition to the chariot ornaments, identical bird-shaped cheek pieces and personal ornaments, including belt plaques of a feline seizing the muzzle of a goat in its jaws, show that the two elite groups from Majiayuan and Pazyryk must have been in close contact, possibly through periodic social and political gatherings (Figures 13–14).[20]

The vehicles and palaces of the First Emperor of Qin

Steppe influence on the material culture of Qin elite has been generally downplayed, even though Qin people likely moved to central China from the steppe or its borderland around the beginning of the 1st millennium BC.[21] The tombs in Gansu, in particular the ornate chariots, prompt us to re-examine this issue. The personal vehicles of the First Emperor of Qin have been viewed as examples of classic Chinese design by scholars.[22] In fact, the designs of the vehicles closely parallel those of Majiayuan and other steppe examples. Two half-size bronze vehicles with figures of draught horses were excavated in a pit which was originally beneath the burial mound that covered the First Emperor's tomb.[23] One of these, a chariot, has an open passenger box which was cast, then painted with a representation of a textile similar to those on vehicles and mounts at Majiayuan and Pazyryk. The design is of a white diagonal grid embellished with red decoration at the interactions. Within each diamond-shaped space are scrolls and an octagonal motif, which are clearly based on the motifs on the Majiayuan chariots and Pazyryk carpet. The framework has geometric patterns like those commonly seen on contemporary Chinese silk (Figure 15).[24]

The other vehicle is a carriage with an enclosed passenger box. A decorative border is painted on the surface of the canopy, while the underside of the canopy and the walls are painted with cloud-like red and blue motifs arranged in a chequer-style layout against a bordered yellow background. The bronze floor is painted with a representation of a cloth (Figures 16–16a). Not only does the form of the carriage resemble the covered carts which mobile herders used on the steppe, but the patterns feature that of a felt saddle blanket from Pazyryk (Figure 17).[25] In short, the vehicle seems to be a variant of a tent-cart, which is emphasised by a bronze version of a portable drawstring bag often used among nomadic communities found inside the vehicle. The gold and silver bridle ornaments, such as the tubular strap fittings and frontals with animal-style motifs, also have parallels at Majiayuan and Pazyryk.[26]

In the First Emperor's palaces, fired clay tiles bearing designs similar to those of the Pazyryk textiles and

[19] Rudenko 1970: figs 73, 78–80; Simpson and Pankova eds 2017: pl. 160; Gansu Sheng Wenwu Kaogu Yanjiusuo 2014: 103–107.
[20] For illustrations of the belt plaques see Rudenko 1970: pl. 67A; Gansu Sheng Wenwu Kaogu Yanjiusuo 2014: 38–39.
[21] Rawson 2018: 113.
[22] Sun 1985; Wang 2012.
[23] Qinyong Kaogudui 1983; Shaanxi Sheng Qinyong Kaogudui 1991 for the excavation reports, and Qin Shihuangdi Ling Bowuyuan 2012 and 2015 for well illustrated monographs.
[24] The technologies used to produce and repair the bronze chariots also point to contacts with western Asia: see Shao *et al.* 2014: 103.
[25] For vehicles used on the steppe, see Miller 2012, in particular figs 1–2.
[26] Rudenko 1970: pl. 101d; Gansu Sheng Wenwu Kaogu Yanjiusuo 2014: 206.

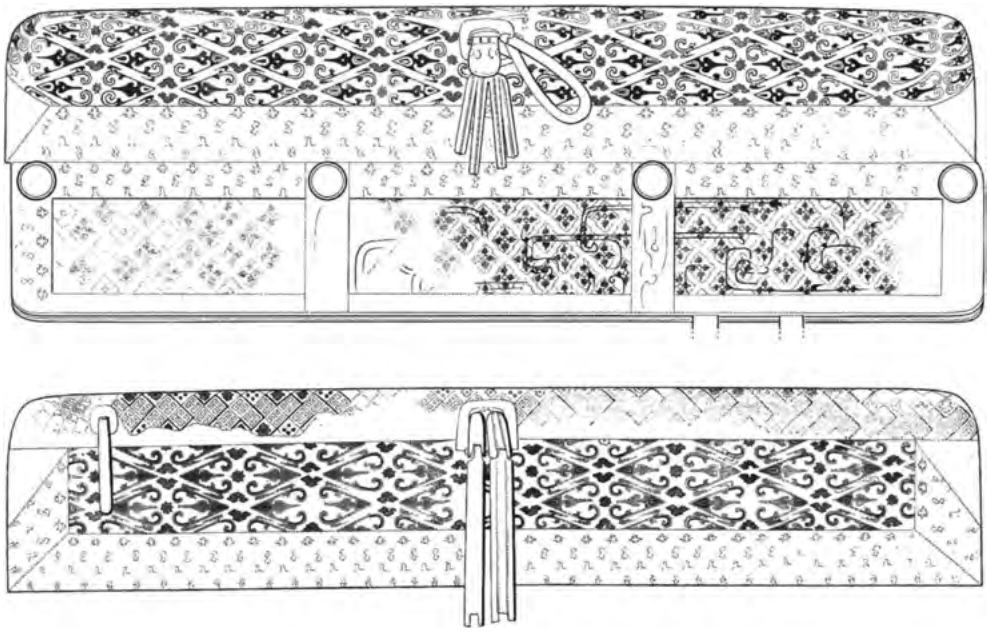

Figure 15. Drawing of the front panel of a chariot showing the textile design on the obverse (upper drawing) and reverse (lower drawing) excavated from the tomb complex of the First Emperor of Qin, Lintong district, Shaanxi province, China, 3rd century BC; bronze with mineral pigments, 73.5 x 22.5 cm (after Qin Shihuangdi Ling Bowuyuan 2012: fig. 223)

Figure 16. Carriage with an enclosed passenger box excavated from the tomb complex of the First Emperor of Qin, Lintong district, Shaanxi province, China, 3rd century BC; bronze with silk and mineral pigments, 104.2 x 328.4 cm (photograph: Raphael Wong)

Figure 16a. Interior of the passenger box in Figure 16 (photograph: Qin Shihuangdi Ling Bowuyuan 2015: fig. 199)

Figure 17. Felt saddlecloth excavated from kurgan 5, Pazyryk, Russia, 4th–3rd century BC; 236 x 70 cm (after Rudenko 1970: col. pl. 160)

Majiayuan chariots were used to decorate floors and stairways. One small difference between the textiles and these copies is the animals, with some wild beasts being replaced by Chinese dragons, which the Qin people were more familiar with.[27] Meanwhile, fired clay tile ends on the roofs were decorated with the floral and animal motifs also seen on the Majiayuan square plaques and chariot wheels.[28]

The design seen on the Pazyryk textiles was popular across Asia, as well as Europe. It has been used across Eurasia in different art forms, such as mosaics and coffin fittings in gold and iron.[29] Mosaic pavements with such designs dating to the 4th and 3rd centuries BC were found in two houses in Olbia in Ukraine: one of these has a central roundel surrounded by real and mythological animals, the second has a design of a diagonal grid and with a wave border pattern similar to one of the saddlecloths we have previously seen. The design is therefore a good proxy for the movement of people, both within and beyond the steppe.[30]

Conclusion

To conclude, this paper has demonstrated that the ornate chariots at Majiayuan are a variant of a carriage from the steppe. Together with previous research, this paper has shown that the Scytho-Siberian material culture extended as far south as present-day northwestern China where the pastoralist elite adopted some steppe styles. By presenting themselves in a way similar to the steppe people, the pastoralist elite created an identity which stressed their individuality from the Central Plain. Through this, they also made a place for themselves at a time when foreign material cultures and practices such as horse riding were gaining more popularity with the Qin.[31] The Qin's liking for foreign fashions is suggested, for example, by recent research on the connection between Hellenistic sculptures and the figures of the First Emperor's tomb, highlighted by Lukas Nickel, which display an unprecedented understanding of the human body and interest in life-size bare sculptures.[32] The contact between the Qin people and mobile pastoralists paved the way for more intense interaction, in addition to a growing globalisation process between China, the steppe and western Asia in later periods.[33] It is hoped that this paper has contributed to our knowledge of the pastoralists living in the eastern steppe and its borderland during the second half of the 1st millennium BC, and that it provides a comparative example for future cross-cultural studies in this and other parts of Eurasia.

[27] Liu and Yan 2003: fig. 5; Shaanxi Sheng Kaogu Yanjiusuo 2004: pls 26.4, 27.3.

[28] For example, see Shaanxi Sheng Kaogu Yanjiusuo 2004: pls 28.4, 31.1.

[29] Miller *et al.* 2009: fig. 7; see also Wong 2017: fig. 9 for a wool fragment with embroidered diagonal grid, circles, scrolls, and diamond designs excavated from a tomb at Sampula (*c.* 2nd century BC–2nd century AD), Xinjiang Uyghur Autonomous Region in China.

[30] Kryzhitskii 1982: figs 14–15.

[31] Duan 2015*a*; 2015*b*; 2015*c*. Cavalry constituted an important part of the Qin army, as evidenced by the terracotta army found in the First Emperor's tomb complex (Yuan 1990).

[32] Nickel 2013.

[33] See Rawson 1999 for foreign object categories and burial practices adopted by the Chinese from the steppe and Near East during the Eastern Zhou (770–221 BC), Qin (221–206 BC) and Western Han periods (206 BC–9 AD); for a good review of trans-ecological exchanges which occurred in the northern Eurasian landmass in the past millennia see Christian 2000.

Conclusions

Nomads have an image problem but only amongst non-nomads (Figure 1). They were barbarians in ancient Greek eyes, but then those writers considered anyone who was not Greek to be a barbarian, thus lumping Scythians with Persians and Egyptians. Ancient written sources tend to dwell on the ferocity of the Scythians in a manner similar to that later accorded to the Mongols. Likewise, Chinese sources traditionally portray non-Chinese as greedy, aggressive and acquisitive, and these attributes became associated with nomads who 'moved in search of grass and water'.[1] Today, people without fixed homes are viewed disparagingly in Western society, even though a tent or even the temporary shade of a tree may be considered a suitable home by those on the move or the so-called 'homeless'. Herodotus gives a more nuanced world view: as an exiled Greek from western Anatolia staying in one or more northern Black Sea ports, he almost sympathises with the Scythians he describes as he attempts the first ethnographic description of where they came from, how they lived, what they ate and drank, believed and valued most. Criticised by literary historians, yet treasured by archaeologists, Herodotus has been loved and hated in equal degree since Thucydides questioned whether his style of writing was really historical.

Figure 1. Barefoot bearded Scythian wearing an off-the-shoulder tunic and a flask slung at his side: a representation on a 4th century BC gilt-silver Greek amphora excavated by Ivan Zabelin at the Chertomlyk kurgan in 1863, H 70 cm (The State Hermitage Museum, St. Petersburg, inv. nr. Dn 1863 1/166)

Before moving to the Eurasian steppe, we might draw some analogies with other pastoralist nomads: some of the earliest depictions and written sources are from Assyria but their carved reliefs show a different sort and one with whom they were in regular contact and conflict within northern Arabia. A retaliatory campaign in 645/640 BC depicts Arab tents being burnt and men fleeing on camels into the desert (Figure 2).[2] The Assyrians also built a chain of forts along their middle Euphrates frontier to control movement across, as well as along, the river,[3] although ironically it was their adoption of Eurasian style horse-mounted warfare which probably gave them the military edge here. However, monitoring and controlling nomads –whether in this region or any other – are two different things: the authors of a Second World War British intelligence handbook for Syria concluded that 'it is difficult for the Bedouin to respect a political boundary, especially when it exists only on a map. Seasonal nomadism eastwards or westwards over the border is common to Iraq, Syria, and Palestine and is not a military aggression'. These authors added that hostilities tend to be between tribes rather than with anyone else, and 'few casualties are caused in such affrays, but they are troublesome and may lead to wider issues'.[4] This is an insight which we will return to below.

Physical geography dictates that linear boundaries such as rivers and mountains act as natural borders: these are often seized as lines of control by sedentary peoples but passes and valleys are conduits for movement and good mountain/lowland connections are essential for vertical transhumance. Today the

[1] Sinor 1978; Di Cosmo 1994.

[2] Reade 1998.

[3] Several were investigated as part of an international archaeological rescue project in advance of the completion of the Haditha dam in Iraq in 1984: they were found at intervals of 10 km or less, located either on midstream islands or on the left bank, in one case with a corresponding fortification on the opposite bank which secured a potential river crossing. Some functioned as less heavily defended outposts but the remainder were very heavily defended: there were three walls around one fort and the Euphrates acted as a linear water barrier on the remaining side. Sadly, there are still only short reports for most of these sites.

[4] Great Britain 1943: 468.

Figure 2. Arab pastoral nomads in retreat: scene from a Late Assyrian relief in the North Palace of King Ashurbanipal at Kuyunjik, 645–640 BC, 127 x 195 cm (The British Museum, inv. nr. 1856,0909.31–32 / 124925, 124926)

section of Euphrates river described above remains a contended strategic point along a natural corridor for traffic and movement between Syria and Iraq, as well as interaction with northern Arabia. As early as the beginning of the 2nd millennium BC, Bronze Age burial mounds in the Haditha area may reflect Amorite tribes in this area, the typology of the mounds recall contemporary burial practices in eastern Arabia, and suggest connections between these tribes before the true domestication of the camel in the 1st millennium BC.[5] It was then that such tribes had the capacity to range deeper into the desert and develop longer-distance overland caravan routes, bringing gold and aromatics from southern Arabia into the Near East, and Herodotus refers to Arabs 'who contributed 1,000 talents of frankincense every year'.[6] It was a desire to control this lucrative trade, rather than madness as his detractors in the Babylonian religious establishment claimed, which led the Neo-Babylonian ruler Nabonidus to destroy the Edomite kingdom, march on Dadanu and shift his imperial court from Babylon to the desert oasis of Tayma for a decade.[7] It is an early hint of realisation that the people in these very different ecozones should act more closely: agriculturalists rely on pastoral nomads for livestock and raw supplies, and in return receive certain manufactured goods, trinkets and sacks of grain. Moreover, attempts to fight nomads rarely succeed as their mobility and better knowledge of their deep hinterlands give them the advantage: reliefs from one room in the North Palace of Ashurbanipal (669–*c.* 631 BC) show Assyrian chariots and cavalry chasing Arabs who chose to retreat at speed on their camels, and in one, the Assyrians enter an oasis, cut down the palm-trees, burn the tents and violently assault the women – the only occasion where such acts are shown in Late Assyrian art.[8] In 530 BC Cyrus II lost his life fighting against the Massagetae somewhere near the Aral Sea;[9] some 17 years later, Darius I campaigned in the northern Black Sea in a likely attempt to add this region to his expanding empire but failed to bring the Scythians to battle and retreated empty-handed.[10] It was easier for states to co-opt nomads as allies, give them titles and pay them off.[11]

In Late Antiquity, the Sasanian state invested heavily in its defences and irrigation projects along the desert fringe of southern Mesopotamia, underlining the importance paid to the security of sedentary society and the agricultural economy. However, following the Arab Conquest, these borderlands appear to have opened up to freer movement and religious pilgrimage between Arabia and the lands to the north. Early medieval writers described the appearance of the new foundation at Basra, how one of its markets was popular with caravans and Bedouin as it included vendors of camel halters, sheep, birds, fat, perfumes and drugs.[12] It was the latter which must have supplied the glazed pottery, glass and beads used by 8th century pastoral nomads occupying the Kuwait bay: these finds, along with traces of seasonal structures, provide an unusual window of visibility of pastoralist activity in this area.[13] For some unknown reason these tribes either stopped coming to this area, and/or were replaced by others who eschewed the baubles of Basra, and the density of datable finds found on an intensive survey there drops to two clay tobacco pipes, some fragmented glass bangles, coarse handmade 'bedouin' pottery, and some coins and tokens dating from the 17th century onwards.[14] It is inconceivable that this area was never traversed by tribes as the local grazing in spring is too rich to be dismissed: the conclusion must be that these later tribes used a material culture dominated by organic materials – the few metal objects or fittings such as coffee pots or gunlocks being too

[5] Kepinski 2010; Magee 2015.
[6] Herodotus, *The Histories* 3.97.
[7] Crowell 2007.
[8] Reade 1998; Dandamayeva and Brereton eds 2019: 140–43, cat. 17.
[9] Herodotus, *The Histories* 1.214.
[10] Herodotus, *The Histories* 4.118–143; Ctesias, *History of Persia* 12–13.20–21 (Llewellyn-Jones and Robson 2010: 181). The failure of this expedition might explain the lack of an equivalent Persian account: however, the discovery in 2016 of a fragmentary Old Persian inscription in a reused 5th century BC excavated context at the Crimean site of Phanagoria raises the possibility that Darius left a stela here although the find has already excited different interpretations (Rung and Gabelko 2018; Kuznetsov and Nikitin 2019; Shaverbi 2019). Although described as white marble, the published photographs suggest it is grey limestone and it is remarkably similar in appearance to monumental Persepolitan inscriptions.
[11] Paul 2003.
[12] Naji and Ali 1981.
[13] Simpson 2019.
[14] Simpson forthcoming.

precious to leave – and their base camps lay outside the zone of intensive survey.[15]

Nomads leave light footprints on the landscape but, like animal tracks or the movement of burglars, they are all detectable in the right conditions or with the requisite experience. Places of particularly good grazing with water and shelter lend themselves for use as base camps which are returned to on a seasonal basis. This ethnographic observation is archaeologically verifiable and these sorts of sites acquire shallow lateral stratigraphy with slightly higher concentrations of finds, including fragmented pottery.[16] Large-scale intensive surveys in parts of the northern Negev and Jordan have indeed found low-density scatters of finds, hearths, windbreaks and tent stones which attest pastoral nomadic activity at different periods from prehistoric times to the present day, and radiocarbon dating of fire installation residues offer a means of dating even the most ephemeral traces. The archaeological adage that absence of evidence is not evidence for absence cannot be clearer when considering the presence and role of pastoral nomads in the landscape, and there are proven methodologies for their archaeological investigation across different landscape types.[17]

We return now to the Eurasian steppe and the focus of these conference proceedings. The region is vast and varied, including undulating grasslands, forest-steppe, high mountain pastures, valleys, rivers and lakes. There is a very long history of human activity in the region, extending from the Palaeolithic period onwards, a huge amount of archaeological research has been undertaken on sites of all periods, and it would be almost impossible to synthesise this meaningfully or in any detail. Instead, these conclusions focus on some of the key research questions arising from the study of Eurasian nomads and provide a context for the answers offered using the different approaches taken by the contributors to this volume. Most are archaeological or use scientific analyses, but some use other approaches. Taylor, Havlicek and Beckwith combine forces to question the common assumption that nomads are simple and point instead to their development of complex societies and elite hierarchies, hubs of power with common values and a shared ideology rather than a loosely knitted periphery. Barfield draws on his broad anthropological experience to explain why and how the tradition of building monumental kurgans was such a feature of Scythian society, what it tells about their social hierarchy and points out that they may be anonymous

Figure 3. Okunev stelae in the Krasnoyarsk Museum of Local Lore (photograph: St J. Simpson 2018)

to us, but were not to their builders. Smirnov analyses a passage in Herodotus which highlights the Scythian use of the whip and discusses it in Avestan terms, and a short paper by D. Shulga draws on a Chinese history to better understand what defined an ideal military leader.

During the 3rd and 2nd millennia BC cattle-herding was the basis of the economy across this vast region of semi-arid steppe, and it was during this long period that wheeled chariots and carts appeared,[18] metallurgy developed,[19] and in some cultures, notably that of the Okunev in the Minusinsk Basin of Khakassia, monumental anthropomorphic stelae carved from stone, with their individual bowed profiles resembling natural-sized tree totems, with occasional traces of red paint proving that once they had been highlighted with ochre (Figure 3).[20] Marsadolov offers a brief review of this extraordinary culture in this volume, and argues that its megalithic mindset was similar to that of prehistoric Britain, and points to its visual imagery

[15] Kennet *et al.* 2013. In contrast, archaeological surveys in the northern Negev desert region of Israel have found remains of Bedouin nomads which can be dated to the 19th century because gunflints belonging to matchlock muskets were found at several campsites (Sass 2000).
[16] E.g., Rosen 1993.
[17] Hole 1979; Chang and Koster 1986; Cribb 1991; Rosen 2017.
[18] Anthony 2007; Kuzmina 2007; Crouwel 2012.
[19] Chernykh 1992; Kuzmina 2003; Legrand 2003.
[20] Esin *et al.* 2014.

including elements that see the beginning of what we now call 'Animal Style' art. How this culture ended and was replaced by the successive Andronov (Fedorov) and Late Bronze Age cultures is unclear,[21] but at around 850 BC there was a rapid cooling event, followed by a more humid climate which re-invigorated the vegetation of the steppe and allowed people to move out of the river valleys and range over larger distances with their livestock. Although environmental determinism is not universally accepted as a cause of cultural change, it cannot be a coincidence in this case that this is precisely when the so-called 'Scythian triad' of horsegear, weaponry and 'Animal Style' art appears in southern Siberia, marking a new and distinct cultural horizon, and the origin of a new lifestyle based on the horse.[22]

The adaptation of the horse from a herd and pack animal to a means of rapid transport revolutionised society, not just on the steppe where grazing, water and terrain allowed free movement, but also along the adjacent southern borders. It created a new predatory approach to acquiring and controlling vast new resources which is reflected in the new weaponry and dynamic early phases of 'Animal Style' art. The 7th century BC Scythian incursions through the Caucasus mountain passes, thence onto the Anatolian and Iranian plateaux and down onto the north Mesopotamian plain, as described in the contemporary Assyrian annals and later by Herodotus,[23] had a transformative effect on Near Eastern warfare and personal mobility.

Understanding the horses allows us to understand more of the people who managed them (Figures 4–5). Vitt's pioneering work on the horse remains from the 'frozen tombs' at Pazyryk was the first such study and indicated that all were geldings aged between two and three and a half years, that they were not local to this area and he further suggested that colour selection may have been related to the relative brittleness of the hooves of different types of horse.[24] Scientific analyses of horse DNA and diet based on more recent discoveries add important new insights. The remains of 14 bridled horses buried in one of the pits at Arzhan-2 were found to be of different heights, and DNA analyses indicated that most must have been maroon, followed in frequency by brown, cream (buckskin) and black (Figure 6);[25] further analysis suggested that they were selected from different herds.[26] A separate scientific study of 14 stallions from 'frozen tombs' at Berel' indicated six were chestnut, four bay, two spotted, two black and one was cream, proving that there was wide diversity in coat colours and this was recognised in the funerary rituals. Genotyping of this group confirmed that these too were from unrelated herds, with no evidence for the inbreeding common in present-day horses. This implies that the Scythians knew how to manage reproduction within their herds and did not rely on a small number of stallions for siring; moreover, other DNA mutations suggest that their breeders selected a diversity of endurance and speed potential.[27] The fact that at both sites there is proof of horses being selected from different herds gives another insight into Herodotus' comment that when 'royal Scythians' died, their corpse was taken on a tour of all his tribes before being interred with 'some horses', and 'fifty of his finest horses' added in a posthumous event a year later.[28] Horses were typically slaughtered for the afterlife with a single blow of a pointed battle-axe to the forehead: this may have been the Scythian equivalent of a humane killing with a bolt-gun but must have involved hobbling the beasts in lines, and the sounds and smells of death must have been deeply affected people and beasts alike. We can only imagine the scenes but, in this warrior culture, were the sounds muffled by a cacophony of artificial sounds, as ibn Fadlan observed with the rituals surrounding a ship burial in Rus?[29]

In this volume Lepetz and his colleagues describe some of their recent analyses of Pazyryk-culture horse burials from the Mongolian Altai and show how these horses were taken into the afterlife with their owners in a way that signifies the love and attention they were regarded with. The elaborate dressing of the 'lead' horses in Pazyryk culture graves has captured the imagination ever since the first discoveries in the Altai at Tuekta, Bashadar and Pazyryk. In her paper in this volume, Ochir-Goryaeva briefly discusses the evolution of the horse headdress masks, raises the question as to whether differences signified particular clans, and observes that evidence for ancient wear and tear implies that they had seen use before burial and that they visually transformed the horses into tangible manifestations of mythical ungulates (Figure 7). Loades discusses the effectiveness and versatility of the Scythian soft pad saddle, and in her paper Stepanova looks at the later development of pad and semi-rigid saddles during Hunnic and Turkic times, presents a detailed classification of saddle terminology and interprets them in the context of their Roman and Sasanian equivalents.

Greater mobility accelerated the pace of introduction of ideas, fashions and technologies: whereas before it might have taken a cart two years to travel the 4,500 km from the Black Sea to Tuva, a horseman could now theoretically go and return within a few months.

[21] Polyakov and Lazaretov 2020.
[22] Van Geel *et al.* 2004; Blyakharchuk *et al.* 2019.
[23] Herodotus, *The Histories* 1.103–106.
[24] Vitt 1952.
[25] Benecke and Weber 2007; Ludwig *et al.* 2009.
[26] Benecke, Pruvost and Weber 2010.
[27] Librado *et al.* 2017.
[28] Herodotus, *The Histories* 4.71–72.
[29] Frye 2005: 69–70.

Figure 4. Scene of a Black Sea Scythian restraining his horse, shown on a gilt silver amphora from the Chertomlyk kurgan (The State Hermitage Museum, St. Petersburg, inv. nr. Dn 1863 1/166)

Figure 5. Scene of a Black Sea Scythian hobbling his horse, shown on a gilt silver amphora from the Chertomlyk kurgan (The State Hermitage Museum, St. Petersburg, inv. nr. Dn 1863 1/166)

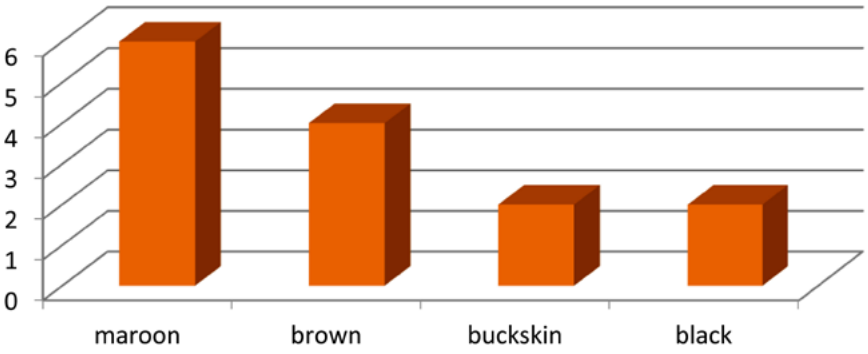

Figure 6. Graph showing horse colours based on DNA evidence from Arzhan-2

Nomads practised an alternative way of life to those brought up in settled societies, although today the phrase 'alternative lifestyle' carries slightly negative connotations. Everything should be fit for purpose, from practical clothing to possessions which are small to medium-sized, relatively light and convenient to pack and transport (Figure 8). Wagons continued to be used though. Herodotus refers to them as where 'all their women and children lived' and transporting the embalmed corpses of the dead;[30] heavy wear on the felloes and abrasion on the axles, wheel sockets and harness holes in the yoke ends of a (probably ceremonial) wagon found in Pazyryk kurgan 5 attest lengthy use before it was dismantled and interred with

[30] Herodotus, *The Histories* 4.73, 114, 121–22.

Figure 7. Horse mannequin in full dress, including a saddle with crupper and chest strap, a shabrack with Chinese silk embroidery, a ceremonial mask and decorated bridle, Pazyryk kurgan 5 (The State Hermitage Museum, St. Petersburg, inv. nrs 1687/101, 179, 192, 195, 211; photograph by Vladimir Terebenin)

the horses.[31] Other types of wheeled vehicles were used too: in his paper on finds excavated in 4th/3rd century BC catacomb tombs at Majiayuan in the Gansu province of northwest China, Wong draws attention to the first appearance of chariots in that region, how they closely resemble those known from the Achaemenid empire, other decorative schemes and details compare closely with contemporary finds from Pazyryk, and how strongly this went on to influence the material culture of the First Emperor and the Qin elite.

Big brown pieces of furniture, such as solid chests and display cabinets, appear in 19th century photographs of yurt interiors and encampments on the move but these were not a feature of the ancient Eurasian steppe. Those which are constants between these two periods are the low tables suitable for a lifestyle seated on floor coverings and cushions, rather than on chairs, and the depiction of a high-backed throne with turned legs on the huge Pazyryk felt hanging underlines the high status of the presumed female deity seated on it.[32] At Pazyryk as many as four of these low tables were found in kurgan 2, standing between 18 and 47 cm in height.[33] Tellingly, these could be easily assembled and taken apart as an early form of 'flat packing' suitable for transport: the legs were turned on a lathe, whereas the oval tops were adzed and in, at least one case, the adzing carefully followed the wood grain and avoided the visible knots, implying the work of a particularly skilled craftsman, and one wonders if the two parts were the work of different individuals.[34] The flat tops were presumably used for serving food, whereas drinks were served in round-bottomed drinking bowls supported in separate felted rings – a form of early place-mat – and in one case the sole preserved corner of a larger (now poorly preserved) rectilinear felt rug from kurgan 2 at Pazyryk still had one of these rings lightly stitched onto it.[35]

All too often we treat ancient material culture as art but this it was not: art for art's sake is a 19th century concept, whereas the products of urban civilisations and nomad societies alike were functional applied arts and crafts. The imagery was heavily imbued with social meaning, much of which we will never understand, but inherent in their iconography and perceived gift exchange value. Most items used by Eurasian nomads were made from locally sourced materials. Traditional nomad material culture is dominated by items made of leather, wool, wood and horn, often highly decorated and enriched with bright colours. In most cases these do not survive well archaeologically, but early woven textiles found at Arzhan-1 in Tuva and described here in detail for the first time by Pankova *et al.* show that finely-woven woollen textiles dyed with non-local plant dyes were being worn in early Scythian elite circles as early as the late 9th or early 8th century study concludes that the textiles quite possibly come from the Xinjiang region.

[31] Rudenko 1970: 189–93, 326, pls 129, 131. Depictions of such wagons are absent from the rock art of Eurasia but as domestic items this is perhaps unsurprising, and a variety of fired clay models of covered four-wheel wagons are found at sites in the northern Black Sea region (Rolle 1989: 114–15, fig. 87; Cunliffe 2019: 211, 214, fig. 8.9). The exceptional presence of a pair of turquoise-inlaid shoe buckles depicting a two-wheeled canopied chariot and found in a 1st century AD nomad grave at Tillya Tepe in northern Afghanistan suggests knowledge of wheeled vehicles, even though these belonged to the elite of Han China and are shown being drawn by fantastic animals (Hiebert and Cambon eds 2011: 266–67, cat. 187; cf. Francfort 2012).

[32] Rudenko 1970: 64, 275, pls 147, 154.

[33] Rudenko 1970: 35, 65–68, pls 50–51.

[34] This table comes from kurgan 2 at Pazyryk and is illustrated by Simpson and Pankova eds 2017: 174–75, cat. 100 (State Hermitage Museum, inv. nr. 1684/36a).

[35] Simpson and Pankova eds 2017: 177, cat. 103 (State Hermitage Museum, inv. nr. 1684/50–51).

Figure 8. Kyrgyz nomads moving camp (pictorial postcard, The British Museum, EPH-ME collection)

The interlocking stepped designs belong to a tradition common on Central Asian painted pottery beginning in the 3rd millennium BC and, although there are no textiles surviving from these earlier periods in Central Asia, the Arzhan-1 finds support the hypothesis that they were inspired by woven patterns and that these were among the oldest motif types in central Asia.[36] Further textiles are known from Arzhan-2 (7th century BC), Bashadar-2 (late 6th–early 5th centuries BC) and Tuekta (5th century BC). Later still, we have the spectacular remains from Pazyryk and more recent discoveries in the Altai mountain region,[37] and in the Pontic west there are other traces in graves, particularly where they were in contact with metal objects which has aided their preservation. Scientific analyses of fragments from nine Scythian tombs in the Black Sea region are presented by Gleba *et al.* in this volume and show the popularity of red-dyed wool, as well as painted wood and leather, the latter a quiver which was possibly made in an urban workshop as it employed Egyptian blue as the pigment. In her own paper, Korolkova also observes that the aesthetic of Achaemenid polychrome personal ornaments would have been appreciated in this nomad world where everything was in full colour, another possible explanation for the aesthetic attraction of some imported objects. Although the basic dress for men seems to have been fairly standardised and perfectly adapted for horse riding and coping with different temperatures, there were probably many subtle variations in cut, colour, cloth and trim, even more so for women and people of elevated status (Figure 9). The finds from the central tomb at Arzhan-2 underline this: the man was wearing a striking red tunic decorated with hundreds of tiny gold appliqués, each in the form of a crouching feline, but sewn on in a bold swirling volute pattern: this was colour, gold and design combined in one striking statement (Figure 10).

Eurasian nomads were skilful metal-workers. Today metallurgy is popularly associated with heavy industry and, in the UK at least, subconsciously associated with the Industrial Revolution but this is highly misleading when it comes to antiquity. The first metal-workers operated in prehistory, drawn to colourful copper ores by their attractive appearance and initially cold-working them before discovering that a small amount of heat could go a long way. Ores and placer deposits are usually located in mountains or river systems far from major settlements: the people who knew where they were and how to exist there while working them were not town-dwellers but hardy explorers and herders, whether in Eurasia, Arabia or the Americas. In this volume, Boroffka describes how a repeatedly used 2nd millennium BC campsite at Sichkonchi Say, only a kilometre from an opencast tin mine at Karnab, suggests a seasonal pattern of ore extraction, and the fact that the shelters were sited on the same spot implies it was the same tribe who returned on each occasion. Panning the river sands for gold must have been a similar seasonal activity, presumably practised in summer when the water was warmer and the flow less violent. A recent study of Xiongnu goldwork from tombs at Noin Ula concluded that placer deposits in Mongolia were the source not only for these objects, but also much gold entering Han Dynasty China.[38] Siberia and the Urals are also gold-rich and knowledge of how to extract it explains why there was such conspicuous consumption of gold on the Eurasian steppe. There have been different views expressed in the literature how particular objects in the Siberian Collection of Peter the Great were made, and it clear that different

[36] Kircho 1975.
[37] Rudenko 1953; 1970; Polosmak and Barkova eds 2005.
[38] Polosmak *et al.* 2019.

Figure 9. Reconstruction of the appearance of the leader buried in the central grave at Arzhan-2 (reconstruction by D.V. Pozdnyakov)

after discovery, thus removing any traces of their burial environment (Figure 11). The question as to how and exactly where they were attached to the belts is now answered by a recent discovery of unrobbed Xiongnu graves at Terezin-I in central Tuva, where they were found to have been mounted on wooden blocks affixed to the belts either side of a central buckle: physical anthropological analyses indicate these burials to belong to women, not men as initially supposed.[40] The results of new scientific analyses of selected objects from the Peter the Great collection, reported here by Mongiatti and Korolkova, add more insights into how they were made, what they were inlaid with and prove that the source of gold was placer deposits as the objects are filled with tiny hard platinum group element [PGE] inclusions.[41] Similar inclusions are found on Scythian or Scythian-related objects in the Oxus Treasure analysed by Mongiatti,[42] but whether these are imports or made locally is unclear as the Pyandzh tributary of the Oxus is equally rich in placer deposits.[43]

A rather different approach to understanding ancient metalworkers' techniques is given here in separate papers by Minasyan and Shablavina, who both discuss a class of Scythian ironwork with gold decoration which they argue was made with overlays, rather than inlays as previously described in the literature. In the absence of metallographic analysis, Minasyan goes on to question the relative development of casting versus forging of ironwork. Some of these same objects are discussed by Satubaldin *et al.* and scientific analyses of those add new insights into their manufacture and unrecorded previous conservation. Regardless

Figure 10. Reconstruction of the design used for the sewn-on appliqués worn by this individual (photograph: Andrey Bronnikov)

traditions and techniques were broadly in use at the same time.[39] Many are belt plaques but all were cleaned

[39] A summary of the main techniques is given in the exhibition catalogue by Minasyan 2017.

[40] Leus and Bel'skiy 2016; Kilunovskaya and Leus 2018*b*.
[41] Ogden 1977; Meeks and Tite 1980.
[42] Mongiatti 2017; 2018.
[43] Benham and Coats 2006.

Figure 11. One of a pair of gold belt plaques from the Siberian Collection of Peter the Great showing a dead or dying male with his head resting on a female's lap, his quiver/bowcase hanging from the tree behind, his horse tethered and a second individual seated, H 12.3, L 16.1 cm (The State Hermitage Museum, St. Petersburg, inv. nr. Si 1/162)

of technique, the final impact of the goldwork and many of the cast bronzes was stunning, and the 19th century discoveries at Kerch inspired Carl Fabergé to commission contemporary versions, as discussed here by de Guitaut in her essay on the manufacture and circulation of 'Scythian revival' objects in imperial Russia. Some original pieces also trickled into different antiquarian collections and reconstructing the original provenance of these is the work that Gorskaya discusses, as she successfully combines archives with die-linking comparison with excavated examples to re-establish their original findspots.

Hunting was an integral part of the mounted lifestyle: it was a necessity in eliminating predators to herd animals, a means of training youths to ride, shoot and lunge spears at fast-moving targets, and offer sport. There is a very long steppe nomad tradition of wearing perforated boars' fangs, either around the neck or sewn onto horse bridles;[44] the discovery of perforated raptor talons in a *c.* 1st century BC–1st century AD jewellery hoard at Znamenka raises the possibility that these were worn as talismans and derived from the use of large birds of prey for hawking,[45] and Ctesias gives a detailed account of the use of such birds for hunting hare and fox by 'pygmies' in India.[46] Hunting not only brought alternative supplies of fresh meat but also offered other resources such as skin, fur, fangs and antler. Studies of worked antler from Hunno-Sarmatian sites in the northern Altai indicate a preference for roe deer, most likely following culling of deer on their local migration routes, but small quantities of red deer antler may reflect the fact that a mature stag has large heavy antlers which offer a good resource for a bone-carver and, in the recent past, Tuvinians used to hunt these stags in February and March when the deer were weak from the rut and easier to hunt in wet sinking snow.[47] Horn and bone were also used to carve small items such as awls, probably used in leather-working, arrowheads, composite bow elements, buckles, hooks, and elements of horsegear: occasionally it was more heavily worked to create heavily decorated buckles, spoons or small containers such as that discussed in this volume by Beisenov.

Pastoral nomads tend to have a relatively simple diet of meat and dairy products of milk, butter, yoghurt and cheese,[48] and some of these key diet ingredients are exceptionally well preserved in the 'frozen tombs' of the Altai. Herodotus remarked on how 'the Scythians are great drinkers of milk', how they used bone tubes during the milking of mares and wooden churns to separate it.[49] Uncooked lower vertebrae of sheep placed in tombs illustrate the value placed on this part of the fat-tailed sheep.[50] The exceptional survival of lumps of cheese in the remains of an elaborately decorated

[44] Simpson and Pankova eds 2017: 234–35, cat. 155 (State Hermitage Museum, inv. nr. 2878/186, 409, 179).
[45] Simpson 2019: 314–15.
[46] Ctesias, *Indika* F45: Photius, F45g: Aelian (Nichols 2011: 50, 65).
[47] Borodovskiy, Michalczeski and Oleszczak 2019.
[48] Pre-Islamic Arab poetry and slightly later written accounts contrast the simplicity of diet (as well as dress) of Arab nomads with the richness of 'Persian' (whether Sasanian or later) food (van Gelder 2000; Simpson 2003*b*).
[49] Herodotus, *The Histories* 4.2.
[50] The fact that they were still articulated proves that they had not been cooked: in the case of food offerings placed in Bronze Age tombs at Jericho it was noted that the cooked meat survived whereas the soft tissue on the adjacent human remains did not, indicating that the chemical change caused by the cooking process affected the differential preservation. Although the burial conditions are completely different, perhaps a similar process was at work in the 'frozen tombs' as the embalmed human remains were also exceptionally well preserved.

bag found with the horses in kurgan 2 at Pazyryk attest the making of a foodstuff rich in calcium, fat, protein, vitamins and omega-3 fatty acids (which modern medical science attest as good for eyesight, mental health, and reduce chronic inflammation).[51] An interesting absence from these tombs are the buckets and churns used in dairying (or indeed many other practical items used in daily life) although the whisks do occur in the later Tashtyk culture cemetery at Oglakhty in the Minusinsk Basin. However, nomads gather as well as herd: there are few edible nuts or berries on the Eurasian steppe but wild cherry was found in the central tomb-chamber at Arzhan-2,[52] in Tuva the local nomads used to collect lily bulbs and edible roots, and analysis of the dental pathology of a young Scythian man excavated at Sebÿstei in the Altai was consistent with him having regularly gnawed on very abrasive foodstuffs such as tubers.[53]

It is generally held that nomads do not cultivate and that is one of their defining characteristics. However, ethnographic and isotopic evidence from across Eurasia indicates that this is not entirely true, and a similar situation is attested from the northern Negev and eastern Arabia.[54] The 10th century Arab traveller ibn Fadlan referred to how the diet of the Bulgar tribes on the lower Volga consisted of horsemeat and millet, and how they stored their food in subterranean silos, a feature he also noted amongst the Oghuz Turks north of Khorezm.[55] This observation illustrates the fact that the grain of choice for Eurasian nomads was broomcorn millet (*Panicum miliaceum*) as it is drought-tolerant, can be sown along streams or near springs, does not require ploughing, has a short growing season of two to three months thus can be planted and harvested before moving camp, and provides a high yield per plant so seed corn can be transported from one camp to another.[56] Millet was originally domesticated in China and used occasionally by pastoralists in the 3rd millennium BC but it is from the Scythian period that is regularly noted in the funerary record of Eurasia.[57] Isotopic analyses of Scythian populations in cemeteries at Ai-Dai and Aymyrylyg in Tuva suggest that at least a third of their diet was millet and the same study noted a greater incidence of caries among the population which confirms that they ate bread.[58] Millet seeds were also found in Tashtyk graves at Oglakhty, where a pilot isotopic study of hair and braided hairpieces of at least three individuals suggested that millet formed part of a diet of at least two of them, as well as fish, C3 plants (wheat and barley), meat and dairy products.[59] The pollen core evidence points to this being a slightly drier period too,[60] so it is easy to see why millet would be popular and the Minusinsk Basin would have attracted immigrants; and in her detailed paper in this volume Pankova draws numerous compelling parallels between the grave-goods excavated in this Oglakhty cemetery and the material culture of the Tarim Basin.

At the opposite end of the Eurasian steppe corridor there are also new data from flotation of samples retrieved from excavations carried out as part of the Samara Valley project in the Ural piedmont, indicating that cereal-based agriculture increased dramatically in the early 1st millennium BC.[61] Further west, flotation of the contents of two AMS-dated Scythian-period pits dug into the top of the earlier site of Zanovskoe on the lower Donets contained seeds of spring-sown hulled barley (*Hordeum vulgare*) and broomcorn millet, together with seeds of white goosefoot (*Chenopodium* cf. *album*) and tuberous pea (*Lathyrus tuberosus*), both edible plants: these plant remains appear to reflect pastoralist nomad cultivation on the floodplain in an area about 200 km from the nearest cluster of settlements around the fortified 55 hectare site of Elizavetovskaya.[62] These add scientific substance to Herodotus' statement that by the 5th century BC there were 'Scythians who farm the land, though not with the aim of eating the crops they cultivate, but rather of selling them on'.[63] In contrast, the environmental finds from Elizavetovskaya itself indicate a fully agricultural support economy with the cultivation of millet, barley and emmer wheat and the herding of cattle and sheep/goat (forming 46.8% and 26.8% of the zooarchaeological assemblage respectively), but also some fishing.[64] A study of tooth enamel of the buried population from the massive fortified 7th–6th century BC complex at Bel'sk – the presumed Gelonus of Herodotus – in Ukraine indicate a similar economy with limited population mobility and a diet based on domesticated crops and livestock herding.[65] This is significant as the walled circuit of this site encloses 4000+ hectares, dwarfing any other site of this period in Eurasia. The site is discussed in this volume by Johnson who looks at the dynamic relationship between the Gelonians of the forest-steppe region, the Scythians and Greek, questions what resources were used to build such massive complexes such as this, and why.

[51] Simpson and Pankova eds 2017: 183, cat. 10 (State Hermitage Museum, inv. nr. 1684 D/1).
[52] Neef 2010: 243.
[53] Simpson and Stepanova 2017: 161.
[54] Marx 1967: 20–24.
[55] Frye 2005: 40, 54.
[56] Vainshtein 1980: 146, 149–50, 155–57, 162.
[57] Frachetti 2008; 2012; Svyatko *et al.* 2013; Spengler 2019: 59–88.
[58] Murphy *et al.* 2013.
[59] Shishlina *et al.* 2016; cf. Simpson and Pankova eds 2017: 346, cat. 262 (State Hermitage Museum, inv. nr. 2864/33). A separate isotopic study also points to fish being a larger component of the diet of earlier (Bronze and Iron Age) populations in the Minusinsk Basin than previously recognised: Svyatko *et al.* 2013: 3941.
[60] Blyakharchuk *et al.* 2014; 2019.
[61] Lebedeva 2005; cf. Anthony *et al.* eds 2016.
[62] Motuzaite-Matuzeviciute, Telizhenko and Jones 2012.
[63] Herodotus, *The Histories* 4.17.
[64] Melyukova 1989*b*.
[65] Ventresca Miller *et al.* 2019.

Nomadic life was hard and affected people in various ways. Direct evidence comes from a small number of anthropological case studies which indicate age at death and evidence of trauma or disease. One of the unexpected results of the analysis of the 40–50 year old man buried in the 7th century BC central tomb at Arzhan-2 was that he had died of prostate cancer and in its advanced stages the man must have been in considerable pain and probably transported in a wagon.[66] A second case of this has been found at Ak-Alakha-3 (kurgan 1) on the Ukok plateau where the so-called 'ice maiden' was found in an unrobbed burial dating to the early 3rd century BC: analysis of her remains indicated that this 28–30 year-old had died of breast cancer.[67] Cancer is often regarded as a disease associated with modern lifestyles and/or pollution but flaws in this argument had already been voiced, not least as there is evidence for tumors in the skeletal record of certain dinosaurs.[68] Elevated levels of copper in her hair also suggest that she had been in regular contact with metal braziers and the so-called 'copper fever' reflected how a side-effect was to enhance the ecstatic effects.[69] This was not simply recreational 'hot boxing' of the sort alluded to by Herodotus whereby they heated cannabis seeds in a confined space until they 'emit a vapour so thick that no steam-bath in Greece could possibly compete with it' with the effect that they 'howl with delight'.[70] Such practice is archaeologically evidenced by tripod supports for felt covers, braziers and singed cannabis seeds found in the Pazyryk kurgans:[71] in this case, however it reflects knowledge of the numbing and pain-killing effect of cannabis, a hint of the depth of accrued knowledge of plant properties which comes with developed pastoral nomadism.

Systematic anthropological studies of Scythian populations are surprisingly few, given the quantity of excavated data for human populations. However, the partial remains of two individuals apparently sacrificed on the edge of the royal Alexandropol kurgan – now dated to *c.* 340–330 BC, as presented in this volume by Polin and Daragan – have been examined in detail.[72] One was aged 40–50 years, the other a late teenager. The former had degenerative changes to the spine consistent with prolonged riding and healed fractures of the right arm consistent with a medium-height fall, such as from a horse. The second individual exhibited greater robusticity of the right ulna which might be explained by frequent drawing of a bow, as well as signs of spinal trauma consistent with riding or carrying heavy loads, thus raising the question as to whether this possible horse archer was also involved in the construction of the tomb. In this volume, Murphy and Chistov discuss the results of their much larger study of an ancient Scythian population, namely that from the extensive cemetery at Aymyrylyg in southern Siberia. This was excavated extensively during the 1960s and 1980s by Dr A.M. Mandelshtam and Dr E.U. Stambulnik of the Sayano-Tuvinsky expedition team from the Institute of the History of Material Culture in St. Petersburg, and the human remains brought back to St. Petersburg where they form part of the collections of the Peter the Great Museum of Anthropology and Ethnography (*Kunstkamera*). Their results, published as a series of peer-reviewed papers in scientific journals as well as in monograph form, are synthesised here for the first time.

The Eurasian steppe is hot in summer but temperatures drop to minus 20°C or more in winter and the north wind is still bitingly chilly as late as March: it is hardly surprising to see that depictions show Scythians wearing hooded jackets and trousers, the ideal all-weather clothing of a rider which has changed little in the subsequent millennia (Figures 12–14).[73] There was also a highly developed fur culture amongst these nomads: the same depictions show fur trim on their jackets and spots on the trousers of Black Sea Scythians depicted on toreutic and clothing appliqués buried in their richest graves.[74] The earliest archaeological evidence for big cat from the Eurasian steppe is Asiatic cheetah (or leopard) fur from Pazyryk kurgans 1 and 2 where it was used for bags, boots and other objects;[75] there is a surprising lack of tiger (either Siberian or the now extinct Amu darya species) or Asiatic lion but this is most likely simply the result of lack of preservation as it seems inconceivable that they would not have been hunted and valued, and in the earliest kurgans (Tuekta and Bashadar) saddle cloths are often made from felt designed to imitate a tiger skin.[76] In this volume Francfort observes not only the transmission of the Asiatic lion motif into the art of the Altai, but also how one of the tattoos on

[66] Schultz *et al.* 2007.
[67] Letyagin, Savelov and Polosmak 2014.
[68] David and Zimmerman 2010: this conclusion contrasted the results of a study of ancient Egyptian mummies with modern medical data but, although immediately picked up by mass media, has been criticised as cancer is commonest in older populations today, consistent with finding from Arzhan-2, where most people died at an earlier age in antiquity. Moreover, it is more difficult to diagnose cancers from bone and most ancient human remains only survive in skeletal form. It might be added here that there is evidence that dinosaurs suffered from cancer too, aptly illustrating how it is not just a product of modern human lifestyle: Rothschild *et al.* 2003.
[69] Polosmak and Trunova 2006.
[70] Herodotus, *The Histories* 4.75.
[71] Simpson and Pankova eds 2017: 164–69, cats 92–96 (State Hermitage Museum, inv. nrs 1684/2, 117, 121, D/8, 1685/12).
[72] Wentz and de Grummond 2009.
[73] Gleba 2008. There is little doubt that trousers were invented for ease of riding: for the earliest radiocarbon dated examples, cf. Beck *et al.* 2014.
[74] E.g., Simpson and Pankova eds 2017: 204–207, 292–94, cats 117–19, 205–207.
[75] Simpson and Pankova eds 2017: 252, cat. 173 (State Hermitage Museum, inv. nr. 1295/233). Identifications made in the 1950s state it is leopard, although the excavator thought it was cheetah.
[76] E. Stepanova, pers. comm.

Figure 12. Black Sea Scythians represented by a Greek goldsmith in the northern Black Sea: decorated terminals of a 4th century BC torc showing Scythian riders, excavated at the Kul-Oba kurgan by Paul Dubrux in 1830, D 31.5 cm (The State Hermitage Museum, St. Petersburg, inv. nr. KO.17)

Figure 13. Black Sea Scythians wearing all-weather riding gear, depicted on a gold vase excavated by Paul Dubrux in the Kul-Oba kurgan in 1830, H 13 cm (The State Hermitage Museum, St. Petersburg, inv. nr. KO 11)

the man buried in Pazyryk kurgan 5 resembles a lion, rather than a tiger as previously interpreted. Other sources of furs found in the Altai-Sayan tombs were red squirrel, sable, weasel, otter, mountain hare and jerboa indicating trapping;[77] there is also sable on the cuffs of a carefully tailored sheep and goatskin coat, and for a face-cover on the cap, as well as otter for a mitten, found in the exceptionally well-preserved tomb 4 in the Tashtyk cemetery at Oglakhty.[78]

[77] Rudenko 1970: 200; Molodin *et al.* 2009; Chernova and Busova 2016; Simpson and Pankova eds 2017: 124, cats 47–48 (State Hermitage Museum, inv. nrs 1684/202, 200).

[78] Simpson and Pankova eds 2017: 348, cat. 264 (State Hermitage Museum, inv. nr. 2874/66); Pankova 2020*b*.

Figure 14. Conversation between a Kazakh herder and Mongolian camel man, Bayan-Olgii (photograph: Barbara Hind, summer 1994)

The 10th century Arab traveller ibn Fadlan encountered fur culture among the Bulghars when he reached the middle Volga as he remarks on how they sourced sable and black fox from a land to the north called Wisu, and the land of Rus also supplied them with sable pelts.[79] A little earlier, a single line reference to the payment of 5000 dirhams for a parcel of furs on an Arabic

[79] Frye 2005: 57, 65.

ostracon found with a small hoard of silver coins dated to 782/783 at Paikend provides a tantalising hint of the trade of furs, alongside textiles such as silk and cotton, in central Asia.[80] During the medieval period it was probably regions such as this which supplied Turkestan with furs and falcons listed among luxury gifts in a chronicle entitled *Kitab Zayn al-Akhbar* ('Book of the Ornament of Histories'), completed by the eastern Iranian writer Gardizi in about 1048, and describing the aftermath of a banquet hosted by the Ghaznavid ruler Mahmud ibn Sebuktegin (r. 999–1030) aimed at impressing Qadir Khan, the Qarakhanid ruler of Mawara-n Nahr (Transoxiana):

> 'When Qadir Khan got back to his encampment and he saw that immense wealth of precious objects, furnishings and carpets, weapons and wealth, he was filled with astonishment and did not know how he could requite Mahmud for them. He ordered his treasurer to open up the treasury door. He took out a great amount of wealth and sent it to Amir Mahmud, together with various items which were specialities of Turkestan, including fine horses with precious trappings and accoutrements of gold; Turkish slave boys with golden belts and quivers; falcons and hawks; pelts of sable (*samūr*), grey squirrel (*sinjāb*), ermine (*qāqum*) and fox (*rūbāh*); vessels made from leather skins; narwhal or walrus horn (? *danīsha-yi khutuww*); delicate cloth and Chinese brocade; Chinese *dārkhāshāk*; and suchlike. The two monarchs parted from each other completely satisfied and in peace and benevolence'.[81]

Livestock herding offers a ready source of leather, whereas quality furs rely on hunting and trapping. New scientific work on samples from quiver covers excavated in mainly 4th century Pontic graves, reported here for the first time by Spindler *et al.*, show a wide range of sources as proteomics allow the identification to species. Most were, unsurprisingly, sourced from domestic livestock, namely sheep or goats and cattle, but there was one unidentifiable carnivore and one exceptional case of human skin which offers grisly corroboration of another remark by Herodotus that Scythians were prone to scalping and flaying their enemies, and making napkins, cloaks and quivers from the skin as 'human skin, it turns out, is thick and has a tremendous sheen, more brilliant, and whiter, than almost any other kind of skin'.[82] Other scientific analyses of wooden Scythian arrow shafts of different periods from the Black Sea to Tuva and the Altai have drawn attention to the survival of painted designs and the sinew binding of the arrowhead but, although the nocks are preserved on complete shafts, there is a puzzling absence of any signs of preparation for fletching – let alone the flights themselves – suggesting that these may have been unfinished arrows left as funerary offerings.[83] Daragan proposes in this volume that short light arrows did not require fletching as this was more essential for long arrow shafts fitted with heavier arrowheads. This of course leaves completely open the question of what feathers were used at this or other early periods;[84] it is not until the Mongol period that the first fletched arrows are preserved, when they are shown to have a preference for crane – perhaps reflecting observations of their long flight paths – but otherwise used any species which were available. This underlines another feature of nomadic society: objects have to be fit for purpose, imagery and sources of materials may be deeply symbolic, but practical needs prevail.

We tend to view our past through rose-tinted glasses, dwell on culture and trade and overlook conflict (Figure 15). Life on the steppe was not always one of harmonious co-existence: herd rustling and the theft of women must have been part of regular competition over pastoral and metal resources. Lucian of Samosata captured it thus: 'We Scythians are always waging war: either we ourselves attack others or we suffer attacks or start fighting over pastures or booty'.[85] The analyses from Aymyrlyg and sites in the Altai show that a small number of individuals of both genders and as young as eight or nine years have signs of violent trauma, including amputation and scalping, with a concentration of blunt force injuries to the head and face.[86] The ubiquity of weapons in male and occasionally female graves proves that this was a weaponised society, and the combination of excavated evidence prove that a pointed battle-axe resembling a modern ice-pick and short daggers were commonly used for hand-to-hand combat, whereas the bow was the weapon of choice for long-distance shooting (Figure 16). Two papers in this volume look at the evidence for this: Loades is an experienced horse archer and re-enactor, and during the conference he memorably demonstrated the practicality of the soft saddle and *gorytos*, and the deadly effect of rapid fire by shooting at a target on stage. His paper returns to some of the popular subjects surrounding Scythian archers: the bow, *gorytos*, evidence for a thumb-draw, arrows,

[80] Kulishev and Saparov 2016: 65–66; this single piece of evidence shows how simplistic most modern discussions are of the so-called 'Silk Road' as they dwell exclusively on silk without consideration of other forms of garment, let alone other commodities.

[81] Gardizi, *The Ornament of Histories*: 94–95; the 9th century author Ya'qubi remarked that furs 'of various animals, sable, fox, ermine, wolf, squirrel' were a speciality of Khorezm in his day (Ya'qubi 1937: 83), and a century later ibn Fadlan refers to the importance of fur rugs during the cold winter he encountered while staying in the city of Jurjaniya (Frye 2005: 31).

[82] Herodotus, *The Histories* 4.65.

[83] However, at Pazyryk Rudenko (1970: 218) noted that 'since some sinew lashing survived at the back end of one shaft', all were probably originally fletched but these portions did not survive for some reason.

[84] The identification of the species used to fletch the arrows found in a model bow-case in tomb 4 at Oglakhty will be reported on in a future study by Pankova.

[85] Lucian, *Toxaris*, 308.

[86] Murphy and Chistov, this volume; Jordana *et al.* 2009; Tur 2019.

Figure 15. Conflict on the steppe: representation on a late 5th or early 4th century BC gold comb excavated in the Solokha kurgan by Nikolai Veselovsky in 1913, 12.6 x 10.2 cm (The State Hermitage Museum, St. Petersburg, inv. nr. 1913 1/1)

Figure 16. The bow was central: a representation on a 4th century BC gilt silver vase from kurgan 3 of the Chastye Kurgans at Podonye shows a Scythian man proffering one to a youth, H 10.5 cm (The State Hermitage Museum, St. Petersburg, inv. nr. Do 1911 1/11)

horse archery, the *Scythicon* and the role of Scythians as police in Athens. A different approach to the same subject is offered here by Daragan who has undertaken the most detailed study yet of the excavated evidence for Scythian arrows found in graves in the northern Black Sea region. Moreover, she presents for the first time the evidence for Scythian bows found in several 4th century BC graves in this region, and proves that they were of composite construction but simply using layers of wood: it was not until the arrival of the Xiongnu that bows using added bone or horn splints start to appear in graves in southern Siberia in the 2nd century BC, then arriving in the Crimea and carried across the Near East and Roman empire by the 1st century AD.[87]

Nomadic and settled societies developed as parallel and complementary, sometimes competing, economies: what Scythians and other early nomads thought of their neighbours we do not know as they did not leave written testimonies, but in comparison with their own prowess at mounted warfare, hunting and riding they probably regarded them as poorly qualified, slow-moving and possibly lazy. They certainly must have developed a good impression of the interests, capabilities, resources and weaknesses through direct interaction with people in border zones, traders, slaves, foreign brides and Scythians returning from service abroad, where they are attested as police enforcers in Athens,[88] and guards on canal boats in Babylonia.[89] In turn, their nearest settled neighbours in the Black Sea ports, southern Caucasus, northwest Iran, southwest Central Asia and China have left no written impressions of their northern neighbours. The sources instead come from the official accounts of the Assyrian and the Achaemenid empires and the observations of Herodotus, gleaned presumably during his stay at a Greek colony in the northern Black Sea. Each give the names of different Scythian rulers ('kings') whose Iranian names offer a simple solution to the common question of how do we know what languages they spoke if they left no inscriptions.

Writing was invented by bureaucrats and developed primarily as a means of economic notation and tax collection, with the necessity then to archive the data

[87] Simpson 1997: 344–45; Chologauri *et al.* 2010: 606–608.
[88] See Loades, this volume.
[89] Dandamaev 1982.

for later retrieval and audit. The complete absence of graffiti from the rock art landscapes proves that these nomads were illiterate and is in complete contrast to regions such as northern Arabia or the modern built environment where names or phrases are commonplace. The presence of an Aramaic inscription on a *c.* 7th century BC horse cheekpiece from Rysaikino in the southern Urals is therefore highly exceptional,[90] but it most likely entered the region with the horse itself, perhaps as a gift from a tribe operating closer to or directly within territories to the south. Another exceptional find is a two-line, yet still undeciphered, alphabetic inscription on a miniature silver dish from Issyk. Not everything in this kurgan was local as it included imported Achaemenid exotica such as a silver spoon,[91] so perhaps this inscribed object derives from one of the many unexplored major settlements in central Asia where writing was being adopted by some, judging by the early Sogdian inscriptions dislodged from the citadel of Kultobe in Kazakhstan and broadly dated between the 1st and 4th centuries.[92] What is clear is that writing had no place in Eurasian mobile society where herds could be measured by counting heads, noting the marks made to the ears of horses or other animals or comparing brands. The practice of notching the ears was noted by Rudenko in his report on the first mound at Pazyryk and he initially concluded that the variety reflected selection from different herds (although he later rescinded this view).[93] However, there are no brands on any of the horses found in 'frozen' Altai tombs and this raises the question of whether this was a later practice: in Eurasia the rise of the *tamga* motif is often associated with Turkic tribes. These motifs appear in central Asian rock art and, although there is controversy over their precise dating, some date as early as the 3rd century judging by their close similarity to *tamgas* depicted on Sasanian rock reliefs and seals,[94] as well as independently dated metalwork from Sarmatian sites where they are found on metal weapons, as well as tablewares and stelae, in the former case presumably added to enhance their potency.[95] These motifs are also a common motif on 5th–8th century bleached carnelian beads, described by Simpson, and Hunnic coins, as discussed by Bakker: the latter offers a major sweeping review of the great impact successive waves of Hunnic peoples – Kidarites, Hephthalites and Alchons – had on the Sasanian and Gupta empires, and offers a new reading on a famous Hephthalite silver bowl found in Swat which shows four Hunnic princes on a hunt. This is not the only paper to focus on post-Scythian nomads of Eurasia. Waghmar uses written sources to describe the role of eastern Saka as they settled to rule Khotan, and weaves into his paper an eloquent excursus on the intellectual framework within which Khotanese studies sit, and how they relate to the exhibition which sparked these proceedings. Moreover, Sutiagina and Kukina use unpublished archival materials to examine the impact the first discoveries of the great Xiongnu cemetery at Noin-Ula in Mongolia in 1924/25 made, after they were first shown abroad in Berlin in 1929.

Nomads do not normally invest in built infrastructure as this is redundant within a mobile pastoral economy and would divert resources from other essential activities (Figure 17). However, there are two exceptions: one is the construction of more substantial shelters for winter, and in the Tuva region of southern Siberia sunken pit-dwellings and/or wooden structures were built for this purpose as late as the 1920s, the ancient knowledge of the log cabin building skills required to construct the tomb chambers at sites such as Pazyryk.[96] The second is the construction of permanent homes for their dead: tombs were their real monuments. In Eurasia, the rise and spread of nomad cultures from east to west was accompanied by widespread mound-building. Most were small and sufficient to mark the interment below of a single individual, but in other cases the scale was truly monumental. The precise types of construction vary according to region and date, and the larger mounds were complex constructions. Great care was taken over the burial of their dead and to embalm the bodies if they were to transported over some distance to tribal cemeteries. Herodotus describes how 'the Royal Scythians slit open the stomach of the corpse, clean it out, fill it with ground aromatic nut-sedge, incense, celery-seeds and aniseed, then sew it back up again and cover it with wax'.[97] In the case of the high Altai the ground was too hard to dig pits at any time except in summer, and the presence of flowers of *Pentaphylloides fruticosa* and *Dasiphora fruticosa* and freshly stripped birchbark sheets in graves at Pazyryk, Ak-Alakha and Berel' confirm that the summer was indeed the time when they were dug and constructed.[98] The transport of the corpse, digging of the grave, felling trees and constructing log-cabin tomb-chambers within and piling of the mound above must have involved large numbers of people and it should be possible to find traces of where they camped and, where the soil cover is thin, a little more

[90] Korolkova 2017*c*.
[91] Simpson and Pankova eds 2017: 302, cat. 217 (National Museum of the Republic of Kazakhstan, Astana, inv. nr. TK1-1845); note that the handle is broken and the supplied photograph incorrectly shows the bird's head lying to one side whereas it was originally reversed above the handle.
[92] Sims-Williams, Grenet and Podushkin 2007.
[93] Rudenko 1931: 30; cf. Rudenko 1970: 117–18.
[94] Reviewed by Manassero 2013 with references.
[95] E.g., Simonenko 1991; Voroniatov 2012*a* (weapons); 2012*b* (stelae); 2013 (horse harness).
[96] Vainshtein 1980: 81.
[97] Herodotus, *The Histories* 4.71.
[98] Rudenko 1970: 28; Simpson and Pankova eds 2017: 274, cat. 188; Simpson and Stepanova 2017: 156; Lepetz 2013: 311.

Figure 17. Different types of tents and yurts were used by Eurasian pastoral nomads although there is little evidence for their appearance in early periods (pictorial postcard, The British Museum, EPH-ME collection)

investment in wider area excavation might identify features such as hearths and post-holes with datable residues within.

Construction of the larger mounds took place in stages over several years, most likely as tribes camped nearby on a seasonal cycle. At Arzhan-2, as Chugunov outlines in this volume, this process may have taken as much as a generation to complete. Construction of the 8th century kurgan at Baygetobe (Chilikty-3) began with a stone and log tomb chamber which was covered with a 65 m diameter stone mound: a pole with an ibex head was set up as a marker and the large quantity of burnt sheep and goat bones, those of a horse, and broken pottery scattered over the top, attest ritual feasting and deliberate deposition of the remains on the tomb itself; this event was then followed by a sequential addition of the earth kurgan until it reached a height of almost 8 m.[99] In each case, construction began with careful ground preparation and eventually involved the removal of huge quantities of grass turf which was cut out and used as solid sod blocks in the construction.[100] In their paper on the Alexandropol royal kurgan, at the opposite end of the Eurasian steppe, Polin and Daragan discuss how long this may have taken and remark on how difficult it is to cut these sods. Moreover, in environments where the soil is thin, this must have caused long-term scarring of the immediate environs of the tombs in question: it is conceivable that the incorporation of large quantities of grassland into the body of the tomb was symbolically conceived as ensuring perpetual grazing in the afterlife,[101] and it most certainly added to the visibility of the monument once construction was completed. In this volume, Boroffka draws attention to how the huge 'kurgan' at Baykara in northern Kazakhstan proved after excavation to be devoid of any burial, and in its final stage resembled a pyramid of wood, stone, turf and clay standing as a 7 m high-visibility memorial or cenotaph. In other cases, as at the late 4th or 3rd century BC kurgan at Zhoan Tobe in southeast Kazakhstan, the mound was surrounded by a carefully constructed ring-road which Boroffka observes resembles a real road-building skill which seems out of place on the Eurasian steppe but which post-dates evidence for Urartian road building in eastern Anatolia,[102] as well as later evidence from the Persian Empire where a paved 'royal road' was constructed in sections along the route connecting Sardis with Susa.[103] The purpose of such a construction around these tombs perhaps reflects a practical solution to the wear caused by regular circumambulatory processions, in which case it recognises the magnetic impulse that these tombs had on the immediate family and/or tribe of the deceased. Writing about Pontic Scythians, Herodotus refers to how the death of a king was followed by embalming the body, holding an elaborate wake as the corpse is 'taken on a complete tour of Scythia', construct a subterranean tomb, fill it with his closest companions, 'some horses' and 'a choice selection of all his other possessions and some golden cups' and 'furiously compete with one another to raise a huge barrow of earth, as vast as they can possibly make it', followed by further rituals and sacrifices 'after a whole year has gone by'.[104] The occasional discovery of smashed potsherds in the stone mounds hint at feasting ceremonies, and probably there is much more to be discovered of these activities further away from the mounds, as discussed in this volume by Polin, Daragan and Bondar, not only for the huge mound at Alexandropol, but also many

[99] Toleubayev, Zhumatayev and Toleubayeva 2013.
[100] Borisov *et al.* 2019.
[101] Observation made by Prof. Tim Taylor during the conference.
[102] Sevin 1988.
[103] Colburn 2013; Balmaki 2016.
[104] Herodotus, *The Histories* 4.71–73.

Figure 18. Tagar culture kurgans clustered in the mouth of a valley at Oglakhty, Republic of Khakassia (photograph: St J. Simpson, 2018)

other (unexcavated) kurgans of different sizes across Eurasia.[105] The exceptionally well preserved remains at the Alexandropol kurgan also included slaughtered men, women and children, discarded clothing and dismembered human remains, and Polin and Daragan draw attention to similar remains from other northern Black Sea kurgans, raise the question of ritualistic cannibalism, detail the quantities of imported wine and meat consumed, and evoke a sobering picture of conspicuous consumption, 'drinking like a Scythian', orgiastic pleasures and murder.

The deliberate visibility of kurgans holds true across the Eurasian steppe: often located in groups or clustered at the entrances of valleys, they – like the Bronze Age cairn fields of eastern Arabia – clearly signified territorial ownership of space and lend themselves well to GIS analyses of their location in the landscape (Figure 18). It is probably no coincidence that at many of these sites, including Arzhan-2 and Barsuchiy Log, discussed here by Boroffka, the construction of the square perimeter 'fence' incorporated stelae with engraved or pecked rock art, either with the scenes deliberately left visible (Figure 19), or partly or completely obscured by the additional construction material (Figure 20). Some of these designs were already old, indicating that the slabs had been reused – although it is unknown from how far away they were brought – but in other cases the motifs are stylistically contemporary with the monuments where they are found and were perhaps added during the initial construction stages. However, in either case, they tacitly acknowledge an earlier human presence in a manner similar to the gradual accumulation of Scythian and later rock art around or on top of older carved panels on exposed cliff faces. In the case of some large kurgans in the northern Pontic region, the edge of the mound was ringed with a high wall constructed with stone which was sometimes brought from considerable distances away: in this volume, Polin and Daragan point out that the stone for the massive retaining wall for the Alexandropol kurgan was sourced as far away as 40–45 and 80–85 km, and some possibly came from the Crimea. One wonders in this case whether this is not another indication of different tribes brought together in one massive endeavour, and that the variety of stones can be taken as a proxy for different groups, like the genetic variety of horses found at Berel' discussed above. At Arzhan-2, Chugunov notes here that the commonly used Devonian sandstone was sourced from an outcrop two km from the kurgan site. In the case of other eastern Scythian kurgans, it is not always clear from where these stones were taken or whether it was simply a case of size and shape that dictated where they were set.

'Animal Style' art is one of the great defining features of Scythian tribes across Eurasia and has attracted monographs, theses and papers since the beginning of the last century. It was applied across media, hard and soft, from rock, metal and wood to felt and human skin. Some became part of the landscape and viewed the viewer. Others were given life as they were portable objects held in the hand, rippled with motion as they were part of horsegear, used as three-dimensional masks to transform lead horses into tangible manifestations of mythological herbivores, as Ochir-Goriaeva discusses in her paper, or glistened and convulsed on the human body in the form of tattoos. Many other papers in this volume examine different aspects of 'Animal Style' art. The possible Bronze Age antecedents in the Okunev

[105] Cf. also Bourgeois *et al.* 2000: 144–45.

Figure 19. Detail of rock art visible on an external slab used in the stone enclosure wall of the barrow at Barsuchiy Log (photograph: St J. Simpson, 2018)

Figure 20. Rock art visible on a slab used in the construction of the stone enclosure wall of the barrow at Barsuchiy Log (photograph: St J. Simpson, 2018)

culture of the Minusinsk Basin has been commented on above in connection with Marsadolov's paper. The characteristics, chronology and development of rock art in this region have attracted academic discussion since the 19th century and occasional examples or squeezes made of them entered museum collections, including the Kunstkamera and State Hermitage Museum: in this volume, Miklashevich focuses on the development of Scythian rock art in the Oglakhty region of the Minusinsk Basin and concludes that, despite this being the focus of extensive research by different scholars, there are important revisions to be made to the chronology of particular variants and it remains difficult equating these with the development of the cultures defined by their kurgans and metalwork. In a second (unpublished) presentation at the conference she also drew attention to the possible use of felt cut-outs as templates. Understanding the diffusion of style raises fundamental questions as to the media to which motifs were applied. Body or skin art is one, as we have already seen, and tattooed single motifs or complex compositions appear to have been common judging by the fact that all Pazyryk culture mummies found in the Altai region bear them,[106] as does one mummy of the Tashtyk culture from Khakassia:[107] the soft tissue does not survive in excavated graves from other regions but the possible remains of a tattooist's tool-kit have been identified among a set of grave-goods from Filippovka in the southern Urals.[108] This suggests that this practice extended at least as far as that region, although doubtless the designs were different and perhaps more closely related to the gold overlay woodwork found in that region.[109]

Kisel offers a succinct, yet enticing, anthropological re-interpretation of the accepted main chronological stages of 'Animal Style' art as he sees them as responses to cultural and political developments in Eurasia: during the rise of rival chiefdoms between the 9th and mid-6th centuries BC the art simply reflects the dominance of beasts of prey over herbivores, whereas the development of a powerful nomadic empire between the mid-6th and first half of the 4th centuries BC correlates to an artistic phase where beasts of prey attack passive ungulates, in turn followed by a breakdown of Scythian tribal society between the mid-4th and 3rd centuries BC when the scenes show more aggressive combat scenes. In another succinct presentation, P.I. Shulga questions whether a single cause – whether migrating peoples or climate change – can really explain major cultural changes, and this problem is returned to by Polin in connection with trying to explain the end of Scythian culture in the northern Black Sea.

'Animal Style' recurs on the hilts and pommels of weapons across Eurasia, and in this volume Topal looks

[106] Barkova and Pankova 2005.
[107] Pankova 2013; 2017.
[108] Yablonsky 2017.
[109] Cf. Aruz, Farkas, Alekseev and Korolkova eds 2000.

at the chronological development of short swords (*akinakai*) and how their pommels become less and less naturalistic in style. Aggressive competition between Scythians and their neighbours is a theme to which Berzovan returns in the context of trying to explain why high-value Scythian objects were found in a mid-5th century BC hoard in a fort at Stânceşti, in present-day Romania: by re-analysing their date and function, he concludes that they may derive from Getae looting of a royal burial belonging to their Scythian rivals. In other cases, it was the motifs and imagery which moved. In his masterful review of nomad interactions with the Achaemenids and their Seleucid successors, Francfort highlights the main motifs which travel and how they are adapted, but also points out that the majority are of local inspiration and based on the indigenous steppe. Korolkova returns to the same topic from a different perspective, notes the strong influence of Achaemenid imagery on some of the gold objects from the Siberian Collection of Peter the Great, and draws attention to how very specific decorative features on a gold aigrette also owe their inspiration to Achaemenid and earlier Phoenician objects. Finally, Beisenov analyses the iconography on a remarkable carved bone container found in an otherwise ordinary Tasmola-culture kurgan in central Kazakhstan: he also reminds us that 'Animal Style' was not the prerogative of the elite but was also used by other strata of society, and how more caution should be paid to interpreting finds such as mirrors or altars as evidence for priestly status of the deceased when such objects could have more prosaic purposes.

The means by which style was transmitted is a thorny problem, particularly in societies without manuscripts or books. In their paper comparing depictions of chariotry in battle scenes between Achaemenids and Scythians – one in a painted wooden tomb at Tatarlı in southwest Anatolia, the other a poplar-wood comb from Taksai-1 in the southern Urals – Summerer and Lukpanova instead conclude that miniature glyptic was the mechanism. However woven and felted media were probably the main media for image transfer: a strip of Achaemenid silk showing a striding lion which was reused for a horse chest strap found in kurgan 5 at Pazyryk could easily have come from the cloth cover of a chariot cab as it is identical to a representation from Persepolis;[110] the famous pile carpet from Pazyryk must also come from somewhere in the interaction zone of central Asia. Textiles were an obvious medium for propaganda and celebration and otherwise rarely survive, for obvious reasons. In a second paper, Lukpanova describes the other finds and construction details of this unusually burnt tomb at Taksai-I, and interprets the principal interment as belonging to that of a priestess whose corpse was dressed in clothing and headgear decorated with numerous small gold appliqués in 'Animal Style'. A pair of inlaid 'Animal Style' gold bangles she was buried with are described in technical detail by Shablavina, with new scientific analysis in the papers by Satubaldin *et al.*

The high mobility of these ancient nomadic populations explains another key point, and that is that ideas as well as objects and individuals could pass extremely quickly across vast distances. It is becoming increasingly clear that the level of interaction between these political entities and adjacent regions was complex, multi-directional and involved factors beyond simply raiding and trading. These must have included mutual gift exchange, movement of itinerant craftsmen to different patrons (not always necessarily by choice) and the local social effects of ladies bringing their personal styles and accessories into different tribes, whether through high-level diplomatic agreement as described on an Assyrian cuneiform tablet dating to *c.* 676 BC,[111] or the capture or exchange of female concubines on an inter-tribal basis. Style is long-lasting whereas fashion is transient and of the moment: when we look at objects, particularly of personal adornment, we should consider how both factors work alongside each other, and that helps explain why 'Animal Style' is prevalent across Eurasia, yet individual items penetrated this cultural world: a pair of gold earrings with cloisonné decoration found in kurgan 2 at Pazyryk are clearly of Achaemenid origin, technically and aesthetically, and became such a valued heirloom at some point along the route of physical transmission that one was crudely repaired.[112] The presence of items of Late Assyrian type in the northern Caucasus, including those reported in this volume by Ryabkova, or recently published from 6th century BC womens' graves at Jubaji in southwest Iran,[113] might be explained by similar mechanisms. Three other papers in this volume discuss beads found in nomad graves in Eurasia and new scientific analyses help demonstrate the vast distances some of them travelled: Meek *et al.* publish the results of a pilot project to analyse some glass beads found at Scythian and later sites in southern Siberia. Some were Phoenician and must have been brought on horseback from the Black Sea, and possibly purchased from Greek or even Phoenician merchants at some market port, but the others are of a central Asian composition and parallels help narrow the date for the Znamenka jewellery hoard of which they were part. At other sites, dating from the 7th century BC onwards, there are other distinctive bleached carnelian beads and a new classification for these is proposed here by Simpson, with new scientific

[110] Simpson and Pankova eds 2017: 306–307, cat. 223 (State Hermitage Museum, inv. nr. 1687/100b); cf. also Lerner 1991: 11–12 (throne cover).

[111] Simpson and Pankova eds 2017: 284, cat. 190 (The British Museum, inv. nr. K.11489).

[112] Simpson and Pankova eds 2017: 136, cat. 66 (State Hermitage Museum, inv. nr. 1684/182–83).

[113] Shishegar 2015.

analyses by Holé *et al.* showing exactly how they were made, and how this technology spread out of India to Eurasia and the Far East. It is easy to imagine the social effects the appearance of the first polished metal mirror had: perhaps for the first time ever in some cases, physical appearance could be appreciated personally without gazing into a bowl of water, they rapidly became desirable items, and local versions were inspired in response to the new demand.[114] With mirrors came cosmetic and scent: multi-compartmented stone palettes found at Filippovka are classic Achaemenid object classes, more likely used for those purposes than for tattooing as the excavator suggested,[115] and alabaster scent bottles are also found there and at other sites.[116] The material culture provides another dimension to Herodotus' remark that they may have used depilatory creams too:

> 'their women do blend water with a mixture of cypress, cedar and frankincense wood, which is pounded by them with a rough stone until a thick paste is formed, whereupon they plaster the paste all over their bodies and faces. Not only does this endow them with a delicious scent, but when they remove the plaster one day later, it leaves them cleansed and gleaming'.[117]

From all these studies – of which this volume captures a mere selection – a much richer, more varied and, occasionally darker, picture emerges of nomadic life on the Eurasian steppe. This was a hard but dynamic environment and these people understood how to exploit it. They took care of their appearance: women used scent and makeup, manicuring was surely not limited to the dead, and leather and fur preserved in the 'frozen tombs' of the Altai prove the antiquity of a form of central Asian dress where coats with false sleeves were slung over the shoulder. Like impossibly tall heels, these were designed to show the onlooker that the wearer was a person of status and others could stoop to perform menial tasks. Unsurprisingly, such forms of coat were gifted, together with trousers, horses and armlets: these are shown at Persepolis being carried by a Scythian delegation and, in this volume Llewellyn-Jones shows how they became part of court attire, as well as everyday dress, in the Achaemenid empire and attesting the impact of the horse-riding cultures of Eurasia on that of Iran.

These people understood their animals and the available natural resources, and were flexible in their response to change. They were highly skilled horse breeders as well as excellent riders. The nomads moved their camps seasonally and varied some of their activities accordingly. After shearing their sheep with knives in the early summer there was plenty of wool for making felt items. This was also the ideal period to weave textiles on ground looms although spinning must have been an all-year-round activity, and the same probably applies to whittling bone or carving small wooden objects. It was in the summer that many tribes sowed and harvested millet. Trapping and hunting were year-round activities. Some tribes also knew how to extract metal: some must have established base camps near the rivers where they knew placer deposits were present and spent part of their time patiently panning as well as probably fishing, whereas others returned year after year to camp near ore veins and extend their mine shafts deeper into the rock. The working of metals did not require large or complicated tool-kits, and the variety of regional styles and quantity of metal in circulation prove they had ample access to metal, knew how to work it and supply it to the nearest settlements. The interaction between these different groups was much more complex than simply avoidance or conflict; there may have been regular tensions but each community relied to some extent on the other and carefully negotiated relationships must have been developed locally. Access to the different areas and types of resource on the steppe and in the valleys must have been jealously guarded by different tribes and sub-tribes. However, the weaponisation of Scythian society and level of inter-personal violence exhibited in the archaeological record illustrate how competition could easily lead to conflict, with resolution through violence rather than tribal discourse. These were people with skills, traditions, beliefs and complex social structures. They developed a sustainable lifestyle which lasted for almost three millennia and one which continues to resonate strongly in the region today.

[114] Simpson and Pankova eds 2017: 134–35, 162, fig. 116, cats 62–65.
[115] Cf. Yablonsky 2017.
[116] Treister 2013*e*.
[117] Herodotus, *The Histories* 4.75.

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Luke Spindler has a background in biochemistry and archaeology, having a BSc in biochemistry from York and an MSc in archaeology from the University of Liverpool. He has carried out MALDI-based research, having studied glycoproteins as biomarkers for disease for his undergraduate and ancient proteomics for species identification during his masters. His research interest is in ancient biomolecules, primarily focusing on proteins, including application of ZooMS (Zooarchaeology by Mass Spectrometry) on a variety of material, including bone, leather, and coprolites, as well as isotopic analysis on human bone collagen. He is now in the School of Archaeology at the University of Oxford.

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Bibliography

Primary sources

Aelian, *Historical Miscellany* (Loeb Classical Library). Cambridge (MA): Harvard University Press (translated by N.G. Wilson, 2014).

Al Tifaschi, *Arab Roots of Gemmology. Ahmad ibn Yusuf Al Tifaschi's Best Thoughts on the Best of Stones*. Lanham (MD) and London: The Scarecrow Press (translated by Abul Huda, 1998).

Ammianus Marcellinus, *History / Ammiani Marcellini rerum gestarum libri qui supersunt*. Leipzig: Teubner (edited by W. Seyfarth *et al*., 1978, in two volumes).

Aristophanes, *Thesmophoriazusae / The Women Celebrating the Thesmophoria* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press (translated by B.B. Rogers, 1924).

Aristotle, *Minor Works* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press (translated by W.S. Hett, 1936).

Arrian, *Anabasis* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press (translated by P.A. Brunt, 1983, in two volumes).

Athenaeus, *The Deipnosophists or Banquet of the learned*. London: Henry G. Bohn (tanslated by C.D. Yonge, 1854).

Bāṇa, *Harṣacaritam*, śrī-Śaṅkaraviracita 'Saṅketa' vyākhyopetam. Hindīvyākhyākāraḥ śrī Jagannātha Pāṭhakaḥ. Caukhambā Vidyābhavan (Vidyābhavana Saṃskṛta Granthamālā 36). Vārāṇasī 1958.

Bāṇa, *The* Harṣa-carita *of Bāṇa* (Oriental Translation Fund, New Series II). London (translated by E.B. Cowell and F.W. Thomass).

Bergamo, Giacomo Fillipo Foresti da, *Supplementum chronicarum orbis ab initio mundi*. Delhi: Gyan Books (2017 reprint).

Blockley, R.C. 1981–83. *Vol. I (1981): The fragmentary classicising historians of the later Roman Empire: Eunapius, Olympiodorus, Priscus and Malchus. Vol. II (1983): Text, Translation and Historiographical Notes*. Liverpool: Francis Cairns.

Carpini, G. di Plano, *The Story of the Mongols whom we call the Tartars*. Boston (MA): Branden Publishing (translated and edited by E. Hildinger, 1996).

Ctesias, *Indika*. London: Bristol Classical Press (edited and translated by A. Nichols, 2011).

Ctesias, *History of Persia* (Routledge Classical Translations). London and New York: Routledge (translated by L. Llewellyn-Jones and J. Robson, 2010).

Curtius Rufus, *History of Alexander* (Loeb Classical Library). Harvard (MA) and London: Harvard University Press (translated by J.C. Rolfe, 1946, in two volumes).

Diodorus Siculus, *The Antiquities of Asia. A Translation with Notes of Book II of the Library of History*. New Brunswick [NJ] and Oxford: Transaction (translated by E. Murphy, 1989).

Diodorus Siculus, *Library of History* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press (translated by C.H. Oldfather, reprinted 2006, in twelve volumes).

Dioscorides Pedanius, *De materia medica*. Hildesheim: Olms (translated by L.Y. Beck, 2005).

Ełishē, *History of Vardan and the Armenian War*. Cambridge (MA) and London: Harvard University Press (translated with commentary by R.W. Thomson, 1982).

P'awstos Buzand [Faustus of Byzantium], *The Epic Histories Attributed to P'awstos Buzand (Buzandaran Patmut'iwnk'). Translation and Commentary*. Cambridge [MA]: Harvard University Press (edited by N.G. Garsoïan, 1989).

Gardizi, *The Ornament of Histories.* London and New York: I.B. Tauris (translated and edited by C.E. Bosworth, 2018).

A History of the Eastern Islamic Lands AD 650–1041. London and New York: I.B. Tauris (translated by C.E. Bosworth, 2018).

Herodotus, *The Histories*. Harmondsworth: Penguin (translated by T. Holland, 2014).

Homer, *Odyssey* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press and William Heinemann (translated by A.T. Murray, 1919, in two volumes).

ibn Khaldun, *The Muqaddimah: An Introduction to History*. Princeton: Princeton University Press (translated by F. Rosenthal and edited by N.J. Dawood, 1969, abridged version).

Łazar P'arpets'i, appendix in *History of Vardan and the Armenian War*. Cambridge (MA) and London: Harvard University Press (translated with commentary by R.W. Thomson, 1982).

Lucian, *Toxaris* in *Vol. V: The Passing of Peregrinus. The Runaways. Toxaris. The Dance. Lexiphanes. The Eunuch. Astrology. The Mistaken Critic. The Parliament of the Gods. The Tyrannicide. Disowned* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press and William Heinemann (translated by A.M. Harmon, 1936).

Ovid, *Metamorphoses* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press and William Heinemann (translated by F.J. Miller, 1977, in two volumes).

Ovid, *Tristia, Ex Ponto* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press and William Heinemann (translated by A.L. Wheeler, 1975, in six volumes).

Pausanias, *Description of Greece* (Loeb Classical Library). Harvard (MA) and London: Harvard University Press (translated by W.H.S. Jones, 1933).

Phylarchus, *Die Fragmente der Griechisken Historiker*. Berlin: Weidmannsche Buchandlung (edited by F. Jacoby, 1929).

Pliny, *Natural History* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press.

Plutarch, *Lives* (Loeb Classical Library). Harvard (MA) and London: Harvard University Press (translated by B. Perrin, reprinted 1994, in eleven volumes).

Polybius, *The Histories* (Loeb Classical Library). Harvard (MA) and London: Harvard University Press (translated by W.R. Paton, 2011).

Priscus, *Fragmenta*, in *Vol. I: The fragmentary classicising historians of the later Roman Empire: Eunapius, Olympiodorus, Priscus and Malchus. Vol. II: Text, Translation and Historiographical Notes*. Liverpool: Francis Cairns (translated and edited by R.C. Blockley, 1981, 1983).

Procopius, *Procopii Caesariensis opera*. Leipzig: Teubner (edited by J. Haury and G. Wirth, 1962–64; four volumes).

Sebeos, *The Armenian History attributed to Sebeos*. Liverpool: Liverpool University Press (translated with notes by R.W. Thomson and historical commentary by James Howard-Johnston, 1999).

Sima Qian, *Records of the Grand Historian of China*. New York: Columbia University Press, (translated by Burton Watson, 1971).

Strabo, *Geography* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press (translated by H.L. Jones, reprinted 2001, in eight volumes).

al-Tabari, *The History of al-Ṭabarī (Ta'rīkh al-rusal wa'l-mulūk). Volume V: The Sāsānids, the Byzantines, the Lakhmids, and Yemen*. Albany: State University of New York Press (translated and annotated by C.E. Bosworth, 1999).

The Secret History of the Mongols: A Mongolian Epic Chronicle of the Thirteenth Century. Boston (MA) and Leiden: E.J. Brill (translated by I. de Rachewiltz, 2006).

Vitruvius, *De architectura* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press (translated by F. Granger, 1931).

Xenophon, *Anabasis* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press (translated by C.L. Brownson and revised by J. Dillery, 1998).

Xenophon, *Cyropaedia* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press (translated by W. Miller, 1914, in two volumes).

Xenophon, *Hellenica* (Loeb Classical Library). Cambridge (MA) and London: Harvard University Press (translated by C.L. Brownson, 1968, in seven volumes).

Xuanzang, *Si-yu-ki: Buddhist Records of the Western World*. London: Trübner & Co. (translated by S. Beal, 1884).

al-Ya'qubi, *Les Pays*. Cairo: Institut Français d'Archéologie Orientale (translated by G. Wiet, 1937).

Zhuge Liang, *Zhuge Liang Bingshu* [*Zhuge Liang's military treatise*]. Beijing: Beijing yanshan chubanshe (edited by Yan Kai, 2008).

Unpublished modern archive reports

Gryaznov, M.P. 1964. Otchet o raskopkah Karasukskogo otrjada v 1964. Unpublished report, Scientific Archive of the Institute of Archaeology of the Russian Academy of Sciences: R-1/2955, 2955a.

Kolotukhin, V.A. 1987. Otchet o rabotakh Severo-Krymskay v 1987. Unpublished report, Scientific Archive of the Institute of Archaeology, National Academy of Sciences of Ukraine, Kiev: 1987/29.

Kovaleva, I.F. and V.N. Shalobudov 1993. Otchet o nauchno-issledovatelskoj rabote po teme Arkheologicheskie issledovaniya v Dnepropetrovskoj oblasti v 1993 g. Unpublished report, Scientific Archive of the Institute of Archaeology, National Academy of Sciences of Ukraine, Kiev: 1993/70.

Kubishev, A.I., V.V. Dorofeyev and A.L. Nechitailo 1984. Otchet o raskopkah Khersonskoi arkheologicheskoi ekspeditsiyi Instituta Arkheologii Akademii Nauk USSR. Unpublished report, Scientific Archive of the Institute of Archaeology, National Academy of Sciences of Ukraine, Kiev: 1984.

Kubishev, A.I., V.V. Dorofeyev, Yu.A. Shilov, A.L. Nechitailo, S.A. Kupriy, N.L. Shevchenko, Yu.I. Tolkachov, A. Sh Amirkhanov, M.I. Abikulova and V.P. Bylkova 1983. Otchet o rabotakh Khersonskoy Arkheologicheskoy ekspeditsii v zone s-va Kakhovskoy orositel'noy sistemy v Khersonskoy i Zaporozhskoy obl. v 1983 g. Unpublished report, Scientific Archive of the Institute of Archaeology, National Academy of Sciences of Ukraine, Kiev: 1983/26.

Kubishev, A.I., Yu.A. Shilov, N.V. Kovalev and A.V. Simonenko 1989. Otchet o rabotakh Chersonskoy ekspeditsii v zone stroitel'stva Kakhovskoy orositel'noy sistemy (raskopki kurganov) v. 1989 g. Unpublished report, Scientific Archive of the Institute of Archaeology, National Academy of Sciences of Ukraine, Kiev: 1989/21.

Kyzlasov, L.R. 1969*b*. Otchet o rabote Khakasskoy ekspeditsii Moskovskogo gosudarstvennogo universiteta v 1969 g. Unpublished report, Scientific Archive of the Institute of Archaeology, Moscow, Russian Academy of Sciences: R-1/4010.

Kyzlasov, L.R. 1973. Otchet o rabote Khakasskoy ekspeditsii Moskovskogo gosudarstvennogo universiteta. Unpublished report, Scientific Archive of the Institute of Archaeology, Moscow, Russian Academy of Sciences: R-1/5096.

Leighton, C. and St J. Simpson 2018. *Scythians: warriors of ancient Siberia*. Summative report on the making of an exhibition at the British Museum.

Leskov, O.M., A.I. Kubishev, Ya.I. Boldin, N.P. Zaraiska, V.V. Otroshchenko, N.N. Cherednichenko, A.N. Rumiantsev and S.B. Yastrebova 1970. Otchet o rabote Kakhovskoi ekspeditsii. Unpublished report, Scientific Archive of the Institute of Archaeology, Moscow, Russian Academy of Sciences.

Manuscript Department of the Scientific Archive of the Institute for the History of Material Culture, Russian Academy of Sciences. On the study of the collections from the Mongolian-Tibetan expedition in 1928. Fonds 2/Inventory 1/1928/File 76.

Manuscript Department of the Scientific Archive of the Institute for the History of Material Culture, Russian Academy of Sciences. On the despatch of artefacts from the collection from Pyotr Kozlov's Mongolian-Tibetan expedition for the exhibition in Berlin. Correspondence. 1928/9. Fonds 2. Inventory 1, 1928–1929. File 86.

Manuscript Department of the Scientific Archive of the Institute for the History of Material Culture, Russian Academy of Sciences. Fonds 2/Inventory 1/1930/File 62.

Manuscript Department of the Scientific Archive of the Institute for the History of Material Culture, Russian Academy of Sciences. Commission on the liquidation of the Repository of Antiquities (Transfer according to deeds). Fonds 2/Inventory 1/1931/File 750.

Mongiatti, A., N. Meeks and S. La Niece 2011. Scientific investigation of two gold artefacts from the temporary exhibition 'Afghanistan: Crossroads of the Ancient World', CSR Analytical Request AR 2011/7, unpublished report, British Museum Department of Scientific Research, London.

Photographic Department of the Scientific Archive of the Institute for the History of Material Culture, Russian Academy of Sciences. Borovko G.I. The exhibition of Chinese art in Berlin (photo). O. 759.

Pleshivenko, A.G. 1987. Otchet o raskopkakh kurganov v Kamensko-Dneprovskom rayone Zaporozhskoy oblasti v 1987 godu. Unpublished report, Scientific Archive of the Institute of Archaeology, National Academy of Sciences of Ukraine, Kiev: 1987/185.

Rooijakkers, T. 2011. Reconstruction drawings of the dress worn by the deceased individuals excavated at Tillya tepe, made in support of the graphic design for the exhibition *Afghanistan: Crossroads of the ancient world*. Department of the Middle East, The British Museum.

The Archive of the State Hermitage Museum. Personal file of G.I. Borovko, 19th September 1917–26th November 1930. Fonds 1/Inventory 13/File 103.

The Archive of the State Hermitage Museum. 1931. Direction and Scientific Section. Lists and Acts of Transfer to the Hermitage of museum items from various institutions and private individuals and their recording in the Hermitage inventory. Vol. I/ Fonds 1/Inventory V/File 1191/1.

The Archive of the State Hermitage Museum. 1934. The transfer to the Hermitage of museum items from various institutions and private individuals and their recording in the Hermitage Museum's inventory. Fonds 1/Inventory V/File 1789/78.

Tite, M.S. 1986. Report on the scientific examination of an etched carnelian bead / Report on the scientific examination of replicate etched carnelian beads (submitted by S. Martikainen and S. Hornytzkyj, Helsinki). Unpublished report, British Museum Research Laboratory, London.

Tsarev, N.V. 1998. Textil' iz ranneskifskogo tsentralnoaziatskogo kurgana Arzhan. Chapter 1 in: Textil'iz kurganov rannih kochevnikov Tsentralnoi Azii I tys. do n.e. (po materialam kollektsii Gosudarstvennogo Ermitazha): 11-26. Unpublished diploma, Archaeology Department, History Faculty, St. Petersburg State University.

Yevdokimov, G.L., Ya.P. Gershkovich and M.I. Fridman 1988. Otchet o rabote Krasnoznamenskoy ekspeditsii v 1988 g.. Unpublished report, Scientific Archive of the Institute of Archaeology, National Academy of Sciences of Ukraine, Kiev: 1988/19.

Yevdokimov, G.L., Ya.P. Gershkovich, M.I. Fridman and A.G. Porutskij 1983. Otchet Krasnoznamennoy ekspeditsii o raskopkah kurganov v Khersonskoj oblasti v 1983 g.. Unpublished report, Scientific Archive of the Institute of Archaeology, National Academy of Sciences of Ukraine, Kiev: 1983/2.

Modern published literature

Acquaro, E. and P. De Vita 2009. *The Phoenicians. History and Treasures of an Ancient Civilization*. Italy: White Star Publishers.

Adali, S.F. 2017. Cimmerians and the Scythians: the impact of nomadic powers on the Assyrian empire and the ancient Near East, in H.J. Kim, F.J. Vervaet and S.F. Adali (eds) *Eurasian Empires in Antiquity and the Early Middle Ages: contact and exchange between the Graeco-Roman World, Inner Asia and China*: 60–81. Cambridge: Cambridge University Press.

Adamova, A.T. and A.B. Nikitin (eds) 2004. *Iran v Ermitazhe. Sozdaniye kollektsiy*. St. Petersburg: State Hermitage Museum.

Adams, N., ed. 2008. *Masterpieces of Ancient Eurasian Art. Selected Objects of Gold and Silver from private Western European and North American collections, 6th century BC – 2nd century AD*. London and Bonn: Eurasian Art Ltd.

Adams, T. 2017. Siberia's softer side, *The Observer* 17th September: 25.

Adrianov, A.V. 1903*a*. Oglakhtinsky mogilnik. *XXIX Illyustrirovannoye prilozheniye k gazete 'Sibirskaya zhizn'* 249 (16 November): 2–4.

Adrianov, A.V. 1903*b*. Oglakhtinsky mogilnik. *XXX Illyustrirovannoye prilozheniye k gazete 'Sibirskaya zhizn'* 254 (23 November): 2.

Adrianov, A.V. 1908. Obsledovanie pisanits v Minusinskom krae letom 1907 goda. *Izvestija Russkogo Komiteta dlya izucheniya Sredney i Vostochnoy Azii* 8: 37–46. St. Petersburg.

Agarwal, S.C. and B.A. Glencross 2011. Building a social bioarchaeology, in S.C. Agarwal and B.A. Glencross (eds) *Social Bioarchaeology*: 1–11. Chichester: Wiley-Blackwell.

Agulnikov, S.M., S.S. Popovich, S.V. Tserna and D.A. Topal 2013. Skifskiy kurgan № 7 u s. Purkary na Nizhnem Dnestre. *Stratum plus* 2013/3: 257–84.

Ahmed, M. 2002. *Living fabric: weaving among the nomads of Ladakh Himalaya*. Trumbull (CT): Weatherhill.

Akishev, A.K. 1976. Novyye khudozhestvennyye izdeliya iz bronzy sakskogo vremeni, in K.A. Akishev (ed.) *Proshloye Kazakhstana po arkheologicheskim istochnikam*: 183–95. Alma-Ata: Kazakh SSR Academy of Sciences.

Akishev, A.K. 1978. *Kurgan Issyk. Iskusstvo sakov Kazakhstana*. Moscow: 'Artiya'.

Akishev, A.K. 1984*a*. *Iskusstvo i mifologiya sakov*. Alma-Ata: Kazakh SSR Academy of Sciences.

Akishev, A.K. 1984*b*. Obraz verblyuda v legendakh Tsentral'noy Azii, in I.N. Gemuev and Yu.S. Khudyakov (eds) *Etnografiya narodov Sibiri*: 69–76. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Akishev, K. and A. Akishev 1998. *Ancient gold of Kazakhstan*. Almaty: DIDAR.

Alekseev, A.Yu. 1984. O meste Chertomlytskogo kurgana v khronologichesky sisteme pogrebeniy skifskoy znati IV–III vv. do n.e. *Arkheologichesky sbornik gosudarstvennogo Ermitazha* 25: 65–75.

Alekseev, A.Yu. 1986. Nashivnye bljashki iz Chertomlytskogo kurgana, in N.L. Grach (ed.) *Antichnaja torevtika*: 64–74. Leningrad: State Hermitage Museum.

Alekseev, A.Yu. 1991. Etyud ob akinakakh, in L.S. Klein, *Arkheologicheskaya tipologiya*: 271–80. Leningrad: Russian Academy of Sciences.

Alekseev, A.Yu. 1993. Unikalnyye ukrasheniya konskoy uzdy iz Aleksandropolskogo kurgana. *Peterburgskiy arkheologicheskiy vestnik* 6: 72–75.

Alekseev, A.Yu. 2000*a*. Les scythes avant et après Alexandre de Macédoine, in *L'Asie des steppes: d'Alexandre le Grand à Gengis Khan*: 32–37. Paris: Réunion des musées nationaux-Fundació 'La Caixa'.

Alekseev, A.Yu. 2000*b*. The Scythians: Asian and European, in J. Aruz, A. Farkas, A. Alekseev and E. Korolkova (eds) *The Golden Deer of Eurasia: Scythian and Sarmatian treasures from the Russian steppes, The State Hermitage, St. Petersburg, and the Archaeological Museum, Ufa*: 41–47. New York: Metropolitan Museum and Yale University Press.

Alekseev, A.Yu. 2000*c*. Naconechniki strel iz Aleksandropol'skogo kurgana i ikh znacheniye dlya istorii skifskikh drevnostey IV v. do n.e., in V.Yu. Zuev (ed.) *ΣΥΣΣΙΤΙΑ: pamyati Yuriya Viktorovicha Andreyeva*: 295–303. St. Petersburg: Aleteyya Publishers.

Alekseev, A.Yu. 2003*a*. *Khronografiya Evropeyskoy Skifii VII–IV vekov do n.e.* St. Petersburg: State Hermitage Publishing House.

Alekseev, A.Yu. 2003*b*. Greben iz kurgana Solokha i skifskie zari 5.-4. vekov do n.e. *Arkheologichesky sbornik gosudarstvennogo Ermitazha* 36: 72–88.

Alekseev, A.Yu. 2008. 'Starshiye' kelermesskiye kurgany, in *Trudy II (XVIII) Vserossiyskogo arkheologicheskogo syezda v Suzdale*: 9/10. Moscow: Institute of Archaeology, Russian Academy of Sciences.

Alekseev, A.Yu. 2009. Kamenny zhertvennik ili baza antropomorfnogo izvayaniya?, in S.S. Bessonova (ed.) *Epokha rannego zheleza*: 12–18. Kiev and Poltava: Institute of Archaeology, Ukrainian National Academy of Sciences.

Alekseev, A.Yu. 2012. *Zoloto skifskikh tsareĭ v sobranii Ėrmitazha*. St. Petersburg: The Art Book (separate editions).

Alekseev, A.Yu. and T.M. Kuznetsova 2001. Kelermes (1990 g. – mound No. 31), in M.P. Abramova and V.I. Markovin (eds) *Severny Kavkaz: istoriko-arkheologicheskiye ocherki i zametki* (Materialy i issledovaniya po arkheologii Rossii) 3: 71–85. Moscow: Institute of Archaeology, Russian Academy of Sciences.

Alekseev, A.Yu. and T.V. Ryabkova 2013. Otnositelnaya khronologiya skifskikh Kelermesskikh kurganov, in *Shestaya mezhdunarodnaya kubanskaya arkheologicheskaya konferentsiya*: 13–18. Krasnodar: Ekoinvest.

Alekseev, A.Yu., V.Yu. Murzin and R. Rolle 1991. *Chertomlyk*. Kiev: 'Naukova Dumka'.

Alekseev, A.Yu., N.A. Bokovenko, S.S. Vasiliev, V.A. Dergachev, G.I. Zaitseva, N.N. Kovalyukh, G. Cook, J. Plicht, G. Possnert, A.A. Sementsov, E.M. Scott and K.V. Chugunov 2005. *Evraziya v skifskuyu epokhu. Radiouglerodnaya i arkheologicheskaya khronologiya*. St. Petersburg: 'Teza'.

Alekseev, A.Yu., E.F. Korolkova, T.V. Rjabkova and E.V. Stepanova 2017. The Scythians and their Cultural Contacts, in St J. Simpson and S. Pankova (eds) *Scythians: warriors of ancient Siberia*: 276–82. London: Thames and Hudson.

Alekseeva, E.M. 1975. *Antichnye busy Severnogo Prichernomor'ja (Svod arkheologicheskih istochnikov) (Part I)*. Moscow: Russian Academy of Sciences.

Alekseeva, E.M. 1978. *Antichnye busy Severnogo Prichernomor'ja (Svod arkheologicheskih istochnikov) (Part II)*. Moscow: Russian Academy of Sciences.

Alekseeva, E.M. 1982. *Antichnye busy Severnogo Prichernomor'ja (Svod arkheologicheskih istochnikov) (Part III)*. Moscow: Russian Academy of Sciences.

Alexandrescu, P. 1997. Zum goldenen Fisch von Witaszkovo (ehem. Vettersfelde), in C. Becker (ed.) *Chrónos. Beiträge zur prähistorischen Archäologie zwischen Nord- und Südost Europa. Festschrift für*

Bernhard Hänsel. Internationale Archäeologie Studia Honoria 1: 683–84. Espekamp: Marie Leidorf.

Alishan, L. 1989. Rostamica I: on the epithet *tāj.bakhsh*. *Studia Iranica* 18: 3–26.

Allan, J. 1914. *Catalogue of the Coins of the Gupta Dynasties and of Śaśāṅka, king of Gauḍa*. London: The British Museum.

Allen, L. 2005. *The Persian Empire*. London: British Museum Press.

Allott, K. 1973. The 'Scythian' in 'The Strayed Reveller'. *Victorian Poetry* 11: 163–66.

Altynbekov, K. 2013. *Vozrozhdenaya iz pepla. Rekonstruktsiya po materialam pogrebeniya zhritsy iz kompleksa Taksay I*. Almaty: Island of Crimea.

Aman ur Rahman *et al.* 2006. A Hunnish Kushan-shah. *Journal of Inner Asian Art and Archæology* 1: 125–31.

Amandry, P. 1959. La Toreutique achéménide. *Antike Kunst 2*: 38-56.

Ambers, J. and St J. Simpson 2005. Some pigment identifications for objects from Persepolis. *ARTA* 2005/002: 1–13.

Ambers, J., C.R. Cartwright, C. Higgitt, D. Hook, E. Passmore, St J. Simpson, G. Verri, C. Ward and B. Wills 2014. *Looted, Recovered, Returned: Antiquities from Afghanistan. A detailed scientific and conservation record of a group of ivory and bone furniture overlays excavated at Begram, stolen from the National Museum of Afghanistan, privately acquired on behalf of Kabul, analysed and conserved at the British Museum and returned to the National Museum of Afghanistan in 2012*. Oxford: Archaeopress Archaeology.

Ambroz, A.K. 1973. Stremena i sedla rannego srednevekovya kak khronologichesky pokazatel (IV–VIII vv.). *Sovetskaya Arkheologiya* 1973/4: 81–98.

Ambroz, A.K. 1979. K statye A.V. Dmitrieva. *Sovetskaya Arkheologiya* 1979/11: 229–31.

Ambroz, A.K. 1992. Bospor. Khronologiya rannesrednevekovykh drevnostey. *Bosporsky sbornik* 1: 6–108. Moscow: 'Arche'.

Amzarakov, P.B. and O.V. Kovaleva 2016. Pamyatniki tashtykskoi cultury mogilnika Abakan 8. *Nauchnoe obozrenie Sayano-Altaya* 1/13: 48–63.

Anarbaev, A.A. 1990. Drevniy nekropol' Fergancev. *Priroda* 1990/4: 57–61.

Anarbaev, A.A. and B. Matbabaev 1994. An Early Medieval Urban Necropolis in Ferghana. *Silk Road Art and Archaeology* 3: 223–49.

Ancient Orient Museum 1998. *Ancient Persia. Arts and Cultures on the Silk Road*. Tokyo: Ancient Orient Museum.

Andreeva, P. 2018. Fantastic Beasts of the Eurasian Steppes: Toward A Revisionist Approach to Animal-Style Art. Publicly Accessible Penn Dissertations, 2963.

André-Salvini, B. 1999. L'idéologie des pierres en Mésopotamie, in A. Caubet (ed.) *Cornaline et pierres précieuses. La Méditerranée, de l'Antiquité à l'Islam. Actes du colloque organise au muse du Louvre par le Service culturel les 24 et 25 novembre 1995*: 373–400. Paris: La Documentation française and Musée du Louvre.

Andrés-Toledo, M.Á. 2016. *The Zoroastrian Law to Expel the Demons: Wīdēwdād 10–15. Critical Edition, Translation and Glossary of the Avestan and Pahlavi Texts*. Wiesbaden: Harrassowitz.

Andreae, B. 1973. *Römische Kunst* (Ars Antiqua). Freiburg: Herder.

Andronikos, M. 1984. *Vergina: the royal tombs and the ancient city*. Athens: Ekdotike Athenon S.A.P.

Andrukh, S.I. 1988. Pogrebeniye ranneskifskogo voina v Prisivashye. *Sovetskaya Arkheologiya* 1988/1: 159–70.

Andrukh, S.I. and G.N. Toshchev 1999. *Mogilnik Mamai-Gora, t. 1*. Zaporozhye: Zaporozhye State University Press.

Andrukh, S.I. and G.N. Toschev 2012. Mogilnik skifskogo vremeni Mamay-gora, in W. Blajer (ed.) *Peregrinationes archaeologiae in Asia et Europa. Joanni Chochorowski dedicatae*: 485–90. Krakow: Profil-Arheo.

Anikeeva, O.V., M.S. Shemakhanskaya and L.T. Yablonsky 2017. Juvelirnye shedevry akhemenidskoy epokhi iz grobnicy znatoy zhenshchiny v yuzhnom Priurale, in V.V. Kidji I.V. Poskacheva and N.V. Tsarev (eds) *Yuvelirnoe iskusstvo i materialnaya kultura*: 5–11. St. Petersburg: State Hermitage Museum.

Annen, S. and B. Helwing (eds) 2017. *Iran. Frühe Kulturen zwischen Wasser und Wüste*. Bonn: Bundeskunsthalle and Hirmer.

Anon. (M.F.) 1884. *Collection Lemmé à Odessa*. Odessa: P. Franzow.

Anon. 1952. Obituary: Professor Michael Rostovtzeff. *The Times* 22nd October: 8.

Anon. 1988. *Shiruku rōdo, oashisu to sōgen no michi [The Grand Exhibition of Silk Road Civilizations. The Silk Road: oasis and steppe routes]*. Nara: Nara Kenritsu Bijutsukan and Nara Prefectural Museum of Art.

Anon. 2001. *Àsia, ruta de les estepes. D'Alexandre el Gran a Genguis Khan*. Barcelona: Fundació La Caixa.

Anon. 2016. *Armenia. Legends of Existence*. Moscow: State Historical Museum.

Anon. 2017. Scythians: Warriors of Ancient Siberia. *Time Out* 19th December: 75.

Anthony, D.W. 2007. *The Horse, the Wheel, and Language. How Bronze Age Riders from the Eurasian Steppes Shaped the Modern World*. Princeton: Princeton University Press.

Anthony, D.W., D.R. Brown, O.D. Mochalov, A.A. Kochlov and P.F. Kuznetsov (eds) 2016. *A Bronze Age Landscape in the Russian Steppes: The Samara Valley Project* (Monumenta Archaeologica 5). Los Angeles: Cotsen Institute of Archaeology Press.

Appelgren-Kivalo, H. 1931. *Alt-Altaische Kunstdenkmäler*. Helsinki: Finnish Antiquarian Society.

Appleyard, H.M. 1978. *Guide to the Identification of animal fibres*. Leeds: Wira.

Arapova T.B. (ed.) 2010. *'Veter v sosnakh ...' 5000 let koreyskogo iskusstva. Iz Natsionalnogo muzeya Korei*. St. Petersburg: State Hermitage Museum.

Arch, N. and J. Marschener 1987. *Splendour at Court: Dressing for Royal Occasions since 1700*. London: Batsford.

Arkell, A.J. 1936. Cambay and the Bead Trade. *Antiquity* 10/39 (September): 292–305, pls I–IV.

Armbruster, B.R. 2005. Technological Aspects of the Oxus Treasure Bracelets, in J. Curtis and N. Tallis (eds) *Forgotten Empire. The World of Ancient Persia*: 135–36. London: British Museum Press.

Armbruster, B.R. 2006. Technische Beobachtungen, in K.V. Chugunov, H. Parzinger and A. Nagler (eds) *Der Goldschatz von Aržan. Ein Fürstengrab der Skythenzeit in der südsibirischen Steppe*: 113–43. München: Schirmer and Mosel.

Armbruster, B.R. 2007. Die Goldschmiedetechnik von Arzhan 2, in W. Menghin and H. Parzinger (eds) *Im Zeichen des Goldenen Greifen. Königs Gräber der Skythen*: 95–99. Munich / Berlin / London / New York: Prestel.

Armbruster, B.R. 2009. Old technology of the ancient Scythians – Gold from the kurgan Arzhan 2, Tuva. *Archéosciences* 33: 187–93.

Armbruster, B.R. 2010. Technologische Aspekte der Goldschmiedekunst aus Aržan 2, in K. Chugunov, H. Parzinger and A. Nagler (eds) *Der skythenzeitliche Fürstenkurgan Aržan 2 in Tuva* (Archäologie in Eurasien 26 / Steppenvölker Eurasiens 3): 183–99. Mainz am Rhein: Philipp von Zabern.

Arnăut, T. 2003. *Vestigii ale sec. VII–III a. Chr. în spațiul de la răsărit de Carpați*. Chisinau: State University of Moldova.

Arrowsmith, S. 2015. *Mappa mundi: Hereford's curious map*. Little Logaston [Herefordshire]: Logaston Press.

Artamonov, M.I. 1966. *Sokrovishcha skifskikh kurganov v sobranii gosudarstvennogo Ermitazha*. Prague and Leningrad: 'Artiya'.

Artamonov, M.I. 1971. Skifo-sibirskoye iskusstvo zverinogo stilya (osnovnye etapy i napravleniya), in *Problemy skifskoy arkheologii. Materialy i issledovaniya po arkheologii SSSR* 177: 24–35.

Artamonov, M.I. 1973. *Sokrovishcha Sakov. Amu-Darinskij klad, Altajskie kurgany, Minusinskie bronzy, Sibirskoe zoloto*. Moscow: 'Artiya'.

Aruz, J., A. Farkas, A. Alekseev and E. Korolkova (eds) 2000. *The Golden Deer of Eurasia. Scythian and Sarmatian Treasures from the Russian Steppes*. New York and New Haven: Metropolitan Museum of Art and Yale University Press.

Aruz, J. and E. Valtz Fino (eds) 2012. *Afghanistan: Forging Civilizations along the Silk Road*. New York: Metropolitan Museum of Art.

Aruz, J., A. Farkas and E. Valtz Fino (eds) 2006. *The Golden Deer of Eurasia: Perspectives on the Steppe Nomads of the Ancient World*. New York and New Haven: Metropolitan Museum of Art.

Asheri, D., A. Lloyd and A. Corcella 2007. *A Commentary on Herodotus Books I–IV*. Oxford: Oxford University Press.

Aspden, P. 2017. Tribal gathering. *Financial Times Weekend*, Life and Arts (26–27 August): 11.

Astasheva, N.I. and V.V. Murasheva 2003. *Kon i vsadnik. Vzglyad skvoz veka*. Moscow: State Historical Museum.

Atwood, C.P. 2012. Huns and Xiōngnú: New Thoughts on an Old Problem, in B.J. Boeck, R.E. Martin and D. Rowland (eds) *Studies in History and Culture in Honor of Donald Ostrowski*: 27–52. Bloomington (IN): Slavica.

Ausstellung Chinesischer Kunst 1929. *Veranstaltet von der Gesellschaft für Ostasiatische Kunst und der Preußischen Akademie der Künste*. Berlin: Würfel Verlag.

Avram, A. 1996. *Histria VIII. Les timbres amphoriques. 1. Thasos, Editura enciclopedică*. Bucharest and Paris: de Boccard.

Azarpay, G. 1959. Some Classical and Near Eastern Motifs in the Art of Pazyryk. *Artibus Asiae* 22/4: 313–39.

Babae, E.V. and R. Mehrafarin 2014. The Analysis of Sacred Zoomorphic Patterns in Sassanian Art. *International Journal of Management and Humanity Sciences* 3/8: 2752–60.

Babenko, L.I. 2005. *Pesochinskiy kurgannyy mogilnik skifskogo vremeni*. Kharkov: Rayder.

Babenko, L.I. and O.V. Shelekhan 2015. Kindzhali z segmentopodibnim perekhrestyam u zibranni Kharkivs'kogo istorichnogo muzeyu. *Arkheologiya* 4: 77–91.

Babenko, T.N., N.Yu. Bredis and L.S. Klochko 2001. Fragmenty tkani iz muzhskogo zakhoroneniya v Bolshom Ryzhanonskom kurgane. *Vostochno-evropeiskij Archeologicheskij Zhurnal* 2/9: 317–20.

Babeș, M. 1993. *Die Poienesti – Lukasevka – Kultur. Ein Beitrag zur Kulturgeschichte im Raum östlich der Karpaten in den letzten Jahrhunderten vor Christi Geburt*. Bonn: Habelt.

Babler, B. 2005. Bobbies or boobies? The Scythian police force in classical Athens, in D. Braund (ed.) *Scythians and Greeks. Cultural Interactions in Scythia, Athens and the Early Roman Empire (Sixth Century BC–First Century AD)*: 113–22. Exeter: University of Exeter Press.

Bacon, E. 1958. *Obok: A Study of Social Structure in Eurasia*. New York: Wenner-Gren Foundation.

Bailey, H.W. 1946. Gāndhārī. *Bulletin of the School of Oriental and African Studies* 11: 764–97.

Bailey, H.W. 1958. Languages of the Saka, in *Iranistik: erster Abschnitt, Linguistik* (Handbuch der Orientalistik I.4.1): 131–54. Leiden: E.J. Brill.

Bailey, H.W. 1968. *Saka Documents: text volume* [I] (Corpus Inscriptionum Iranicarum V.I). London: Percy Lund, Humphries and Co.

Bailey, H.W. 1970. Saka studies: the ancient kingdom of Khotan. *Iran* 8: 65–72.

Bailey, H.W. 1971*a*. Trends in Iranian studies. *The Memoirs of the Toyo Bunko* 29: 1–16.

Bailey, H.W. 1971*b*. The culture of the Iranian kingdom of ancient Khotan in Chinese Turkestan: the expansion of early Indian influence into Northern Asia. *The Memoirs of the Toyo Bunko* 29: 17–29.

Bailey, H.W. 1972. A half-century of Irano-Indian studies. *Journal of the Royal Asiatic Society* 2: 99–110.

Bailey, H.W. 1976*a*. Sakastāna, in I. Afshar (ed.) *Farhang-i Irān zamīn [Miscellanea in Honorem Ibrahim Purdavud / Yādgār Nāmeh-yi Pūrdāvūd]* 21: 8–12.

Bailey, H.W. 1976*b*. Saka of Khotan and Ossetia. *Philologia Orientalis* 4: 34–39.

Bailey, H.W. 1977/78. North Iranian Saka. *Annals of the Bhandarkar Oriental Research Institute* [Diamond Jubilee Volume] 58/59: 45–46.

Bailey, H.W. 1978. The orbit of Afghan studies. *Afghan Studies* 1: 1–8.

Bailey, H.W. 1979*a*. North Iranian problems. *Bulletin of the School of Oriental and African Studies* 42: 207–10.

Bailey, H.W. 1979*b*. *Dictionary of Khotan Saka*. Cambridge: Cambridge University Press.

Bailey, H.W. 1982. *The Culture of the Sakas in ancient Iranian Khotan* (Columbia Lectures in Iranian Studies 1). Delmar [NY]: Caravan Books.

Bailey, H.W. 1983. Khotanese Saka literature, in E. Yarshater (ed.) *The Cambridge History of Iran: the Seleucid, Parthian and Sasanian Periods*: vol. 3/2, 1230–43. Cambridge: Cambridge University Press.

Bailey, H.W. 1985*a*. *Indo-Scythian Studies: Being Khotanese Texts*. Cambridge: Cambridge University Press.

Bailey, H.W. 1985*b*. Saka, in *Khotanese texts VII*: 63–75. Cambridge: Cambridge University Press.

Baipakov, K.M., D. Voyakin and S.V. Zakharov 2016. *Mogilnik Karatuma. Nekropol' rannego zheleznego veka v Semirechye*. Almaty: TOO 'Archeologicheskaya ekspertiza'.

Bakker, H.T. 2005. A note on Skandagupta's Bhitarī Inscription, vv. 8–12, in R.K. Sharma and Devendra Handa (eds) *Revealing the Past: recent trends in art and archaeology. Prof. Ajay Mitra Shastri Commemoration Volume*: 248–51. New Delhi: Aryan Books.

Bakker, H.T. 2006. A Theatre of Broken Dreams. Vidiśā in the Days of Gupta Hegemony, in M. Brandtner and S. Kumar Panda (eds) *Interrogating History. Essays for Hermann Kulke*: 165–87. New Delhi: Manohar.

Bakker, H.T. 2014. *The World of the Skandapurāṇa. Northern India in the Sixth and Seventh Centuries* (Supplement to Groningen Oriental Studies). Leiden: E.J. Brill.

Bakker, H.T. 2017. *Monuments of Hope, Gloom, and Glory, in the Age of the Hunnic Wars. 50 Years that Changed India (484–534)*. Royal Netherlands Academy of Arts and Sciences, Amsterdam, 24th J. Gonda Lecture 2016.

Bakker, H.T. 2018. A Buddhist Foundation in Śārdīysa. A new interpretation of the Schøyen Copper Scroll. *Indo-Iranian Journal* 61: 1–19.

Balakhvantsev, A.S. 2015. Bimetallichesky klevets iz Buguruslan i problema stanovleniya ranneskifskoy kultury, in S.I. Luk'jashko (ed.) *Voina i voennoe delo v skifo-sarmatskom mire. Materialy mezhdunarodnoy nauchnoy konferentsii, posvyashchennoy pamyati A. I. Melyukovoy*: 22–25. Rostov: Southern Scientific Centre.

Balakhvantsev, A.S. and L.T. Yablonsky 2007. Akhemenidskaja emal' iz Filippovki (problema khronologii pamyatnika). *Rossiyskaya Arkheologiya* 2007/1: 143–49.

Balakina, G.G., V.G. Vasilyev and V.I. Mamatyuk 2005. Issledovaniye krasnyh i sinih krasitelej v obrazcah drevnego tekstilia, in N.V. Polosmak and L.L. Barkova (eds) *Kostyum i tekstil' pazyryktsev Altaya*: 194–97. Novosibirsk: Infolio Press.

Ball, W. 2010. *Towards One World: Ancient Persia and the West* (Asia in Europe and the Making of the West 2). London: East and West.

Balmaki, B. 2016. New Evidence for the Achaemenid Royal Road in the Alvand Mountains (Hamedan, Iran). *Antiquity* Project Gallery 349/90 (February): https://www.antiquity.ac.uk/projgall/balmaki349

Balogh, D. (ed.) 2020. *Hunnic Peoples in Central and South Asia.* Sources for their Origin and History. Groningen: Barkhuis.

Bandurovsky, A.V., Yu.V. Buynov and A.K. Degtyar 1998. Novye issledovaniya kurganov skifskogo vremeni v okrestnostyakh g. Lyubotina, in Yu.V. Buynov (ed.) *Lyubotinskoye gorodishche*: 143–82. Kharkov: Region-inform.

Bao, M. 1989. Cemeteries on the outskirts of Loulan, China. *Archaeological Textile Newsletter* 8: 4–5.

Baratov, S.R. 2019. K k probleme istokov i khronologii urbanizirovannoy kultury Khorezmskogo oazisa. Unpublished paper delivered at the International Scientific Conference, 'Antiquities of Eastern Europe, Central Asia and Southern Siberia in the context of relations and interactions in the Eurasian cultural space (new data and concepts), dedicated to the 90th birth anniversary of Vadim M. Masson', St. Petersburg, 18th November 2019.

Barbier, J.-P. 1996. *Art des steppes. Ornements et pièces de mibilier funéraire scyto-sibérien dans les collections du Musée Barbier-Mueller*. Geneva: Musée Barbier-Mueller.

Bârcă, V. 2012. Funerary Rite and Rituals of the Early Sarmatians (second and first centuries BC) in the area between the mouths of the Don and the Danube, in R. Kogălniceanu, R-G. Curcă, M. Gligor and S. Stratton (eds) *Homines, Funera, Astra. Proceedings of the International Symposium on Funerary Anthropology, 5–8 June 2011, '1 Decembrie 1918' University (Alba Iulia, Romania)* (BAR International Series 2410): 141–55. Oxford: Archaeopress.

Barfield, T. 1981*a*. The Hsiung-nu Imperial Confederacy: Organization and Foreign Policy. *Journal of Asian Studies* 41: 45–61.

Barfield, T. 1981*b*. *The Central Asian Arabs of Afghanistan: Pastoral Nomadism in Transition*. Austin: University of Texas Press.

Barfield, T. 1989. *The Perilous Frontier: Nomadic Empires and China*. Cambridge (MA): Blackwell.

Barfield, T. 1993. *The Nomadic Alternative*. Englewood Cliffs (NJ): Prentice Hall.

Barfield, T. 2002. Turk, Persian and Arab: Changing Relationships between Tribes and State in Iran and along Its Frontiers, in N. Keddie (ed.) *Iran and the Surrounding World: Interactions in Culture and Cultural Politics*: 61–88. Seattle: University of Washington Press.

Barfield, T. 2006. Nomadny Pastoralizm vo Vnutrenney Azii, in L.E. Grinin, D.M. Bondarenko, N.N. Kradin and A.V. Korotaev (eds) *Rannee gosudarstvo, ego alternativy i analogy: Sbornik statey*: 415–41. Volgograd: Uchitel.

Barkova, L.L. 1979. Pogrebeniye koney v kurgane Shibe. *Arkheologichesky sbornik gosudarstvennogo Ermitazha* 20: 55–65.

Barkova, L.L. 1999. Konskaya maska iz pervogo Pazyrykskogo kurgana. *Arkheologichesky sbornik gosudarstvennogo Ermitazha* 34: 97–101.

Barkova, L.L. and S.V. Pankova 2005. Tattooed Mummies from the Large Pazyryk Mounds: New Findings. *Arkheologiya, Etnografiya i Antropologiya Evrazii* 22 (2005/2): 48–59.

Barnes, J. (ed.) 1995. *The Complete Works of Aristotle, Volume Two*. Princeton: Princeton University Press.

Barnett, R.D. 1975. *Assyrian Sculpture in the British Museum*. Toronto: McClelland and Stewart.

Barthold, W. 1977. *Turkestan down to the Mongol Invasion*. [UK]: E.J.W. Gibb Memorial Trust (fourth edition).

Barthold, W. 1987. Khotan, in M.Th. Houtsma, A.J. Wensinck, T.W. Arnold, W. Heffening and E. Levi-Provençal (eds) *E.J. Brill's First Encyclopaedia of Islam 1913–1936*: vol. 4, 969–70. Leiden: E.J. Brill.

Barthold, V.V. and J.M. Rogers 1970. The burial rites of the Turks and the Mongols. *Central Asiatic Journal* 14/1–3: 105–27.

Bartholomae, C. 1904. *Altiranisches Wörterbuch*. Strassburg: Karl J. Trübner.

Batchayev, V.M., T.B. Bartseva and B.M. Kerefov 1985. *Arkheologicheskiye issledovaniya na novostroykakh Kabardino-Balkarii v 1972–1979 gg., t. 2*. Nalchik: Elbrus.

Batsukh, D. 2015. Les tombes de la culture de Pazyryk de l'Altaï mongol, in P.-H. Giscard and T. Turbat (eds) *France–Mongolie: Découvertes archéologiques. Vingt ans de partenariat. Catalogue d'exposition / Mongol-Frantsyn arkheologiĭn nėėltüüd. Khoryn zhiliĭn khamtyn azhillagaa. Uzėsgėlėngiĭn katalog*: 81–95. Ulan Bator: ShUA-iĭn Tüükh, arkheologiĭn khürėėlėn.

Baughman, E. 2003. Scythian Archers, in C.W. Blackwell (ed.) *Dēmos: Classical Athenian Democracy*: 1–3, in A. Mahoney and R. Scaife (eds) *The Stoa: a consortium for electronic publication in the humanities* [www.stoa.org] edition of 30 January 2003.

Baumer, C. 2012. *The History of Central Asia: the Age of the Steppe Warriors*. London: I.B. Tauris.

Baumer, C. 2014. *The History of Central Asia: the Age of the Silk Roads*. London: I.B. Tauris.

Bazarsad, N. 2003. Four cases of trepanation from Mongolia, in R. Arnott, S. Finger and C.U.M. Smith (eds) *Trepanation: History, Discovery, Theory*: 203–208. Lisse: Swets and Zeitlinger.

Beck, H.C. 1930. Notes on Sundry Asiatic Beads. *Man* 30 (article 134): 166–82.

Beck, H.C. 1933. Etched Carnelian Beads. *The Antiquaries Journal* 13/49: 384–98, pls LXVI–LXXI.

Beck, H.C. 1941. *The Beads from Taxila* (Memoirs of the Archaeological Survey of India 65). Calcutta: Government of India.

Beck, P. 1972. A note on the reconstruction of the Achaemenid robe. *Iranica Antiqua* 9: 116–22.

Beck, U., M. Wagner, X. Li, D. Durkin-Meisterernst and P.E. Tarasov 2014. The invention of trousers and its likely affiliation with horseback riding and mobility: a case study of late 2nd millennium BC finds from Turfan in eastern Central Asia. *Quaternary International* 348 (October): 224–35.

Beckwith, C.I. 1984. Aspects of the Early History of the Central Asian Guard Corps in Islam. *Archivum Eurasiae Medii Aevi* 4: 29–43. (reprinted in C.E. Bosworth (ed.) *The Turks in the Early Islamic World*: 275–89. Aldershot: Ashgate, 2007).

Beckwith, C.I. 2009. *Empires of the Silk Road: A History of Central Eurasia from the Bronze Age to the Present*. Princeton (NJ): Princeton University Press.

Beckwith, C.I. 2010. A Note on the Heavenly Kings of Ancient and Medieval Central Eurasia. *Archivum Eurasiae Medii Aevi* 17: 7–10.

Beckwith, C.I. 2016. The earliest Chinese words for 'the Chinese': the phonology, meaning, and origin of the epithet Ḥarya ~ Ārya in East Asia. *Journal Asiatique* 304/2: 231–48.

Beckwith, C.I. 2018*a*. On the Ethnolinguistic Identity of the Hsiung-nu', in Zs. Gulacsi (ed.) *Language, Government, and Religion in the World of the Turks: Festschrift for Larry Clark at Seventy-Five* (Silk Road Studies 19): 33–55. Turnhout: Brepols.

Beckwith, C.I. 2018*b*. The three Ecbatanas and the Silk Road. The Silk Road: Between Central Eurasia and China, Second Indiana University – Peking University Workshop, Bloomington, 23–24 March 2018.

Beckwith, C.I. forthcoming. *The Scythian Empire and the Classical Revolution in Persia and China*.

Beijing Shi Wenwu Yanjiusuo 2007. *Jundushan mudi: Yuhuangmiao* [*Jundushan cemetery: Yuhuangmiao*]. Beijing: Wenwu chubanshe.

Beisenov, A.Z. 2002. Kurgany s 'usami' – kultovye pamyatniki sakov Centralnogo Kazakhstana, in E.V. Yarovoy (ed.) *Drevneyshie obshchnosti zemledelcev i skotovodov Severnogo Prichernomoriya (V tys. do n.e.–V v. n.e.)*: 213–16. Tiraspol: Scientific-research laboratory 'Archaeology'.

Beisenov, A.Z. 2013*a*. Die nekropole Taldy-2 in beziehung zu den kulturen der fruhsakishen zeit osteurasiens, in T. Stöllner and Z. Samashev (eds) *Unbekanntes*

Kasachistan. Archäologie im Herzen Asien. Katalog zur Ausstellung im Bergbaumuseum Bochum: vol. II 595–608. Bochum: Deutsches Bergbau Museum.

Beisenov, A.Z. 2013*b*. Predmety iskusstva rannih sakov Saryarki kak svidetel'stva vzaimodejstvija kultur. *Vestnik Kemerovskogo gosudarstvennogo universiteta* 3(55): 13–17.

Beisenov, A.Z. 2015. Poseleniya i mogilniki sakskoi epochi Centralnogo Kazakhstana, in A.Z. Beisenov (ed.) *Sakskaya kultura Saryarki v kontekste izucheniya etnosotsiokulturnykh protsessov Stepnoy Evrazii: sbornik statey, posvyashchenny pamyati arkheologa K.A. Akisheva*: 11–38. Almaty: Research Centre of History and Archaeology 'Begazy-Tasmola'.

Beisenov, A.Z. 2017*a*. Tasmolinskaiya kultura Saryarki, in A.Z. Beisenov (ed.) *Kazakhstan v sakskuiu epochu*: 59–100. Almaty: Institute of Archaeology.

Beisenov, A.Z. 2017*b*. Kurgany s 'usami' Tsentralnogo Kazakhstana, in A.Z. Beisenov and V.G. Loman (eds) *Archeologitcheskoe nasledie Tsentralnogo Kazakhstana: izutchenie i sohranenie. Sbornuk statei, posvyatshennyi 70-letiy Tsentralno-Kazakhstanskoi Archeologitcheskoi Ekspedithii*: 31–37. Almaty: Research Centre of History and Archaeology 'Begazy-Tasmola'.

Beisenov, A.Z., D.B. Duisenbay and S.V. Svyatko 2017. Kurgan s 'usami' Jamantas. *Samarski nautchnyi vestnik* 3: 227–31.

Beisenov, A.Z., U.U. Umitkaliev and M.A. Kulkova 2016. Radiouglerodnaya data kurgana s 'usami' Kyrykungir (Vostochnaya Saryarka). *Evraziya v kajnozoe. Stratigrafiya, paleoehkologiya, kultury* 5: 249–55.

Beisenov, A.Z., A.O. Ismagulova, E.P. Kitov and A.O. Kitova 2015. *Naselenie Tsentralnogo Kazakhstana v I tys. do n.e.* Almaty: Institute of Archaeology.

Beisenov, A.Z., S.V. Svyatko, A.E. Kassenalin, K.A. Zhambulatov, D. Duisenbai and P.J. Reimer [= Beisenov *et al.* 2016*a*] 2016. First Radiocarbon Chronology for the Early Iron Age Sites of Central Kazakhstan (Tasmola Culture and Korgantas Period). *Radiocarbon* 58: 179–91.

Beisenov, A.Z., D.B. Duisenbay, I.K. Ahiyarov and S.V. Svyatko [= Beisenov *et al.* 2016*b*] 2016. Radiouglerodnye daty kurgana s 'usami' iz mogilnika Tandaily 2 v Centralnom Kazakhstane. *Evraziya v kainozoe. Stratigrafiya, paleoehkologiya, kultury* 5: 233–39.

Beisenov, A.Z., G.S. Dzhumabekova, G.A. Bazarbaeva and D.B. Duisenbay [= Beisenov *et al.* 2016*c*] 2016. Nahodka kostiyanogo futliyara v kurgane tasmolinskoi kultury. *Tyragetia* (N.S.) 10 (25) 1: 225–36.

Beisenov, A.Z., G.S. Dzhumabekova, G.A. Bazarbaeva, D.B. Duisenbay and I.K. Akhiyarov 2017. Vichrevye kompozzii v iskusstve sakov Tsentralnogo Kazakhstana. *Archeologiya i davnyaya istoriya Ukrainy* 23/2: 40–58.

Beisenov, A.Z. (ed.) 2015. *Sakskaya kultura Saryarki v kontekste izucheniya etnosotsiokulturnykh protsessov Stepnoy Evrazii: sbornik statey, posvyashchenny pamyati arkheologa K.A. Akisheva*. Almaty: Research Centre of History and Archaeology 'Begazy-Tasmola'.

Bell, G.L. 1907. *Syria: The desert and the sown*. London: William Heinemann.

Bellasis, A.F. 1856. Further Observations on the Ruined City of Brahminabad in Sind. *Journal of the Bombay Branch of the Royal Asiatic Society*: 413–25.

Bendrey, R., S. Lepetz, T. Turbat, P. Henri-Giscard, A. Zazzo, M. Balasse, G.I. Zaitseva, K.V. Chugunov, J. Ughetto, K. Debue and J.-D. Vigne 2017. Nomads, horses and mobility in Iron Age Central Asia: preliminary interpretations of movements based on oxygen isotope compositions of horse tooth enamel from the Mongolian Altai, in M. Mashkour and M. Beech (eds) *Archaeozoology of the Near East 9: papers in honour of Hans-Peter Uerpmann and François Poplin. Proceedings of the 9th Conference of the ASWA (AA) Working Group Archaeozoology of South-west Asia and Adjacent Areas*: 262–72. Oxford: Oxbow.

Benecke, N. 1994. *Der Mensch und seine Haustiere. Die Geschichte einer jahrtausendealten Beziehung*. Stuttgart: Konrad Theiss.

Benecke, N. 2013. Faunal remains of Kurganzol, in L.M. Sverchkov (ed.) *Kurganzol: krepost' Aleksandra na yuge Uzbekistana*: 172–78. Tashkent: SMI-ASIA.

Benecke, N. and C. Weber 2007. Die pferdeskelette von Arzan 2, in W. Menghin and H. Parzinger (eds) *Im zeichen des goldenen greifen – Königsgräber der skythen*: 92–94. Munich / Berlin / London / New York: Prestel.

Benecke, N., M. Pruvost and C. Weber 2010. Die Pferdeskelette – Archäozoologie und Molekulargenetik, in K. Chugunov, H. Parzinger and A. Nagler (eds) *Der skythenzeitliche Fürstenkurgan Aržan 2 in Tuva* (Archäologie in Eurasien 26 / Steppenvölker Eurasiens 3): 249–56. Mainz am Rhein: Philipp von Zabern.

Benham, A.J. and J.S. Coats 2006. Minerals in Afghanistan: the potential for gold. http://nora.nerc.ac.uk/id/eprint/10926/ [accessed 25/12/2019].

Benjamin, C.G.R. 2007. *The Yuezhi. Origin, Migration and the Conquest of Northern Bactria* (Silk Road Studies 14). Turnhout: Brepols.

Benjamin, C.G.R. 2018. *Empires of Ancient Eurasia: the first Silk Roads era, 100 BCE–250 CE*. Cambridge: Cambridge University Press.

Beresneva, L. 1976. *The Decorative and Applied Art of Turkmenia*. Leningrad: Aurora.

Berezkin, Yu.E. n.d. Oruzhie Groma [Motif № 13], in *Tematicheskaya Classifikatsia i Raspredelenie Folklorno-Mifologicheskih Motivov po Arealam. Analiticheskyi Katalog:* http://www.ruthenia.ru/folklore/berezkin

Berlizov, N.E. 1996. Sarmaty v Predkavkaze. Nekotorye aspekty issledovanija, in A.B. Belinskiy (ed.) *Materialy po izucheniyu istoriko-kulturnogo naslediya Severnogo Kavkaza, vol. VIII: 'Krupnovsky readings' 1971–2006*: 549–50. Moscow: 'Pamyatniki istoricheskoj mysli'.

Berlizov, N.E. 2003. 'Temnyj vek' sarmatskoj istorii (k probleme vydelenija kompleksov III v. do n.e. v Prokhorovskoj kulture, in *Materialy i issledovaniya po arkheologii Kubani*: vol. 3, 93–105. Krasnodar: Scientific Research Institute of Archaeology, Kuban University.

Berlizov, N.E. 2011. *Ritmy Sarmatii. Savromato-sarmatskie plemena Yuzhnoj Rossii v VII v. do n.e. – V v. n.e.* Krasnodar: KGUKI, Parabellum Publ.

Bernard, P. 1987. Review of Pugachenkova and Rempel 1991 (earlier Russian version). *Abstracta Iranica* 10: 67–69.

Bernard, P. 2005. De l'Euphrate à la Chine avec la caravane de Maès Titianos (c. 100 ap. n. è.). *Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres* 149/3 (July–October): 929–69.

Bernard, P. and H. Inagaki 2000. Un torque achéménide avec une inscription grecque au musée Miho (Japon) (information). *Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres* 144/4: 1371-1437.

Bernardini, W. 2004. Hopewell geometric earthworks: A case study in the referential and experiential meaning of monuments. *Journal of Anthropological Archaeology* 23: 331–56.

Berndt, G.M. 2018. Alans, in O. Nicholson (ed.) *The Oxford Dictionary of Late Antiquity*: vol. 1, 40–41. Oxford: Oxford University Press.

Bernshtam, A.N. 1940. *Kenkolsky mogilnik* (Arkheologicheskiye ekspeditsii gosudarstvennogo Ermitazha II). Leningrad.

Bernshtam, A.N. 1951. *Ocherk istorii gunnov*. Leningrad: Leningrad State University Press.

Bernshtam, A.N. 1952. *Istoriko-Arkheologicheskie ocherki Tientralyanogo Tyani-Shany i Pamiro-Alai* (Materials and Research on the Archaeology of the USSR 26). Moscow and Leningrad: Soviet Academy of Sciences, Institute of History of Material Culture.

Berzovan, A. 2016. Observații privind funcționalitatea unor piese din tezaurul de la Stânceşti, comuna Mihai Eminescu, jud. Botoșani. *Cercetări Istorice* (N.S.) 35: 49–59.

Bessonova, S.S. 1973. Pogrebeniye IV v. do n.e. iz Trekhbratnego kurgana, in *Skifskiye drevnosti*: 243–52. Kiev: 'Naukova Dumka'.

Bessonova, S.S. 2008. Pogrebeniye № 3 iz srednego Trekhbratnego kurgana, in M. Treister (ed.) *Trekhbratniye kurgany. Kurgannaya gruppa vtoroy poloviny IV–III vv. do n.e. v Vostochnom Krymu* (Drevnyaya torevtika i yuvelirnoye delo v Vostochnoy Yevrope 3): 61–68. Simferopol and Bonn: Universum.

Bessonova, S.S. and S. Skory 2001. *Motroninskoe gorodische skifskoi epokhi (po materialam raskopok 1988–1996 g.)*. Krakow: Institute of Archaeology, National Academy of Sciences of Ukraine.

Bessonova, S.S., M.B. Kobalov and A.I. Kubishev 2005. Kurgan bilya Olbia (skifskie pokhovannya). *Archaeologia* 3: 38–51.

Bibikova, V.I. 1973. K interpretacii osteologicheskogo materiala iz skifskogo kurgana Tolstaya Mogila. *Sovetskaya arkheologiya* 1973/4: 63–68.

Bichurin, N.Ya. [Father Hyacinth] 1950. *Sobranie svedeniy o narodakh, obitavshikh v Sredney Azii v drevniye vremena, I*. Moscow and Leningrad: Soviet Academy of Sciences.

Bidzilya, V.I. and S.V. Polin 2012. *Skifskij carskij kurgan Gajmanova Mogila*. Kiev: 'Scyth'.

Bilinsky, O.O. 2018. Horodyshcha skifskoho chasu v dniprovskomu livoberezhnomu lisostepu: zahalna kharakterystyka, kataloh, typolohiya. *Archeologiya i davnyaya istoriya Ukrainy* 26/1: 213–34.

Bishop, M.C. 1988. Cavalry Equipment of the Roman Army in the First Century AD, in J.C. Coulston (ed.) *Military Equipment and the Identity of Soldiers. Proceedings of the first Roman Military Research Seminar, Sheffield, 1983* (BAR International Series 394): 67–196. Oxford: British Archaeological Reports.

Bivar, A.D.H. 1959. Details and devices in Sassanian sculptures. *Oriental Art* 5: 11–14.

Bivar, A.D.H. 1996. Professor Sir Harold Bailey, FBA. *Journal of the Royal Asiatic Society* 6: 407–10.

Bivar, A.D.H. 1969. The nomad empires and the expansion of Buddhism, in G. Hambly (ed.) *Central Asia*: 35–48. London: Weidenfeld and Nicolson Ltd.

Bivar, A.D.H. 1983. The history of eastern Iran, in E. Yarshater (ed.) *The Cambridge History of Iran: the Seleucid, Parthian and Sasanian Periods*: vol. 3/1, 181–231. Cambridge: Cambridge University Press.

Blakesley, J.W. 1854. *Herodotus, with a Commentary*. London: Whittaker.

Blazhey, A. and L. Shutyy 1977. *Fenol'nye soedineniya rastitel'nogo proiskhozhdeniya [Phenolic Compounds of Plant Origin]*. Moscow: Mir.

Blinov, I.A., M.N. Ankushev, M.N. Sdykov and Ya.A. Lukpanova 2014. Content of gold products of Taksai-I burial ground (western Kazakhstan). *Geoarchaeology and archaeological mineralogy* 1: 142–49.

Blyakharchuk, T., N.M. Tchebakova, E.I. Parfenova and A.J. Soja 2014. Potential influence of the late Holocene climate on settled farming versus nomadic cattle herding in the Minusinsk Hollow, south-central Siberia. *Environmental Research Letters* 9/6: doi:10.1088/1748-9326/9/6/065004

Blyakharchuk, T., V. Prikhodko, M. Kilunovskaya and H-C. Li 2019. Vegetation and climate reconstruction based on pollen and microbial records derived from burial mounds soil in Tuva Republic, Central Asia. *Quaternary International* 507: 108–23.

Boardman, J. 1994. *The Diffusion of Classical Art in Antiquity*. London: Thames and Hudson.

Boardman, J. 2000. *Persia and the West. An Archaeological Investigation of the Genesis of Achaemenid Art*. London: Thames and Hudson.

Boardman, J. 2001. Aspects of 'Colonization'. *Bulletin of the American Schools of Oriental Research* 322: 33–42.

Boardman, J. 2003. The Tillya Tepe gold: a closer look. *Ancient West and East* 2/2: 348–74.

Boardman, J. 2010. *The Relief Plaques of Eastern Eurasia and China. The 'Ordos Bronzes', Peter the Great's Treasure, and their kin* (BAR International Series 2146). Oxford: Archaeopress.

Bobrinsky A.A. 1894. *Kurgany i sluchaynye arkheologicheskie nakhodki bliz mestechka Smely, t. 2: Dnevmiki raskopok 1889–1897 gg. Gr. Alexeja Bobrinskogo [i o kurganakh Zvenigirodskogo, Kanevskogo and Romenskogo yesdov]*. St. Petersburg: Tipografia Stasyulevicha.

Bobrinsky A.A. 1914. Otchet o raskopke v Kievskoy gubernii v 1912 godu. *Izvestiya Imperatorskoy arkheologicheskoy komissii* 54: 99–108.

Bobrov, V.V. and N.N. Moor 2011. Zverinyy stil v dekore tagarskikh kinzhalov. *Arkheologiya Yuzhnoy Sibiri* 25: 146–51.

Bocco, R. 1990. La Sédentarisation des Pasteurs Nomads: Les Experts Internationaux Face à la Question Bedouine dans le Moyen-Orient Arabe (1950–1970). *Cahiers des Sciences Humaines* 26 (1-2): 97–117.

Bogdanov, E.S. 2006. *Obraz khishchnika v plasticheskom iskusstve kochevykh narodov Tsentralnoy Azii (skifo-sibirskaya khudozhestvennaya traditsiya)*. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Böhmer, H. and J. Thompson 1991. The Pazyryk carpet: A technical discussion. *Source: Notes in the History of Art* 10/4: 30–36.

Bökönyi, S. 1968. Mecklenburg Collection, Part I, Data on Iron Age Horses of Central and Eastern Europe. *American School of Prehistoric Research, Peabody Museum, Harvard University* 28: 3–71.

Bökönyi, S. 1974. *History of domestic mammals in central and eastern Hungary*. Budapest: Akademiae Kiado.

Bokovenko, N.A. 1995*a*. The Tagar Culture in the Minusinsk Basin, in J. Davis-Kimball, V.A. Bashilov and L.T. Yablonsky (eds) *Nomads of the Eurasian Steppes in the Early Iron Age*: 299–314. Berkeley: Zinat Press.

Bokovenko, N.A. 1995*b*. History of studies and the main problems in the archaeology of southern Siberia during the Scythian period, in J. Davis-Kimball, V.A. Bashilov and L.T. Yablonsky (eds) *Nomads of the Eurasian Steppes in the Early Iron Age*: 255–61. Berkeley: Zinat Press.

Bokovenko, N.A. 2014. Obraz olenya v iskusstve rannikh kochevnikov Tsentral'noy Azii: tendentsii razvitiya i interpretatsii. *Trudy IV (XX) Vserossiyskogo arkheologicheskogo s'ezda v Kazani*: 5–7. Kazan: Otechestvo.

Bolt, D.G. 1991. Burial in an ancient northern Mesopotamian town: The evidence from Tell Mohammed 'Arab. Unpublished PhD dissertation, University of California, Berkeley (Ann Arbor: University Microfilms International, 1993).

Boltric, Yu.V. 1997. Pro mistse zhinochikh pokhovan v kurganakh skifskoï eliti. *Arkheologiya* 1997/1: 28–37.

Boltric, Yu.V. and O.Ye. Fialko 1996. *Povernennia do Chmyrevoi Mohyly*: 30–32. Muzeini chytannia: Tezy dopovidei naukovoyi konferencyi Muzeyu istorychnyh koshtovnostey Ukrainy.

Boltric, Yu.V. and O.Ye. Fialko 2007. Traktemirov: A Fortified City site on the Dnieper, in D. Braund and S. Kryzhitsky (eds) *Classical Olbia and the Scythian World: From the Sixth Century BC to the Second Century AD*: 103–20. Oxford: Oxford University Press.

Boltric, Yu.V. and O.Ye. Fialko 2012. Ostanni doslidzhennja kurganu Chmireva Mogila, in *Arkheologiya i drevnyaya istoriya Ukrainy (Kollektsii Nauchnyh fondov IA NANU. Istochniki i issledovaniya)*: vol. 8, 50–57. Kiev: IA NANU.

Boltrik, Yu.V. and I.P. Savovsky 1991. Kurgan Ploskaya Mogila, in Yu.V. Boltrik and Ye.P. Bunyatyan (eds) *Kurgany stepnoj Skifii*: 98–102. Kiev: 'Naukova Dumka'.

Bonartz, D. and M. Treister 2013. Vorderasiatische Importobjekte in Gräbern der frühen Nomaden im westlichen Kasachistan, in T. Stöllner and Z. Samashev (eds) *Unbekanntes Kasachistan. Archäologie im Herzen Asien. Katalog zur Ausstellung im Bergbaumuseum Bochum*: vol. 2, 715–31. Bochum: Deutsches Bergbau Museum.

Bondar, K. and Yu. Bashkatov 2014. Rekonstruktsiya arkheolohichnoho landshaftu poselennya Dmytrivka III za danymy vysokotochnoyi mahnitometriyi. *Arkheologiya i davnya istoriya Ukrainy* 13/2: 102–106.

Bondar K., M. Daragan and S. Polin 2018. Modelling of space and reconstruction of the funeral ritual at a Scythian kurgan burial after magnetometry and archaeological prospection. *Virtual Archaeology* 3: 13-28. http://virtualarchaeology.ru/pdf/329_va2018_book.pdf

Bonfante, L. (ed.) 2011. *The Barbarians of Ancient Europe: Realities and Interactions*. Cambridge: Cambridge University Press.

Bonhams 1995. *Fine Antiquities. Catalogue of an auction held in Knightsbridge on 4th July at 11 am and 2.30 pm*. London: Bonhams.

Bopearachchi, O. 2008. q,v. Jihoṇika, in E. Yarshater (ed.) *Encyclopaedia Iranica* 14/6: 645 http://www.iranicaonline.org/articles/jihonika [accessed 12th January 2018]

Borisov, A.V., M.V. Krivosheev, R.A. Mimokhod and M.V. El'tsov 2019. 'Sod blocks' in kurgan mounds: Historical and soil features of the technique of tumuli erection. *Journal of Archaeological Science, Reports* 24 (April): 122–31.

Borisova, V.V. 1974. Keramicheskie kleyma Hersonesa i klassifikacija hersonesskih amfor. *Numizmatika i epigrafika* 11: 99–124.

Borodovskiy, A.P., K. Michalczewski and Ł. Oleszczak 2019. Roe deer antler as a raw material in the Hunno-Sarmatian period in the northern Altai, CPAG 29: 55–69.

Boroffka, N. 2009. Simple technology: casting moulds for axe-adzes, in T.L. Kienlin and B. Roberts (eds) *Metals*

and society. Studies in honour of Barbara S. Ottaway (Universitätsforschungen zur Prähistorischen Archäologie 169): 246–57. Bonn: Dr. Rudolf Habelt.

Borovka, G. 1928. *Scythian Art*. London: Bouverie House and Ernest Benn.

Bosworth, A.B. 1988. *Conquest and Empire: The Reign of Alexander the Great*. New York: Cambridge University Press.

Botalov, S.G., A.D. Tairov and I.E. Lyubchanskii 2006. *Kurgany s 'usami' uralo-kazakhstanskih stepei*. Chelyabinsk: Institute of History and Archaeology, South Ural Branch of the Russian Academy of Sciences.

Bourgeois I., L. Cammaert, C. Massart, J.H. Mikkelsen and W. Van Huele 2000. *Ancient Nomads of the Altaï Mountains: Belgian-Russian multidisciplinary archaeological research on the Scytho-Siberian culture* (Royal Museums of Art and History, Monographs in General Prehistory 5). Bruxelles: Musées royaux d'Art et d'Histoire.

Bourova, N. 2004. Horse remains from the Arzhan-1 and Arzhan-2 Scythian monuments, in E.M. Scott, A.Y. Alekseev and G. Zaitseva (eds) *Impact of the environment on Human Migration in Eurasia* (NATO Sciences Series IV: Earth and Environmental Sciences): 323–32. Dordrecht / Boston / London: Kluwer.

Boyce, M. 1955. Zariadres and Zarēr. *Bulletin of the School of Oriental and African Studies* 17: 463–77.

Boyce, M. 1989. *A History of Zoroastrianism. Volume One. The Early Period*. Leiden: E.J. Brill (reprint).

Brandt, L.Ø., A.L. Schmidt, U. Mannering, M. Sarret, C.D. Kelstrup, J.V. Olsen and E. Capellini 2014. Species Identification of Archaeological Skin Objects from Danish Bogs: Comparison between Mass Spectrometry-Based Peptide Sequencing and Microscopy-Based Methods. *PLoS ONE* 9/9: e106875. doi:10.1371/journal.pone.0106875

Brashinsky, I.B. 1965. Novyye materialy k datirovke skifskoy plemennoy znati Severnogo Prichernomoria. *EIRENE* 4: 89–109.

Braudel, F. 1971. *Die Geschichte der Zivilisation. 15. bis 18. Jahrhundert*. München: Kindler Verlag.

Braund, D. 2006. In search of the creator of Athens' Scythian archer-police: Speusis and the 'Eurymedon vase'. *Zeitschrift für Papyrologie und Epigraphik* 156: 109–13.

Braund, D. 2007. Black Sea Grain for Athens? From Herodotus to Demosthenes, in V. Gabrielson and J. Lund (eds) *The Black Sea in Antiquity: Regional and Interregional Economic Exchanges*: 39–68. Aarhus: Aarhus University Press.

Braund, D. and S. Kryzhitsky (eds) 2007. *Classical Olbia and the Scythian World: From the Sixth Century BC to the Second Century AD*. Oxford: Oxford University Press.

Brazier, J. 1994. Neurofibromatosis and optic nerve tumours, in D. Taylor (ed.) *Pediatric Ophthalmology*: 247–60. London: Blackwell.

Brecoulaki, H. 2014. 'Precious colours' in ancient Greek polychromy and painting: material aspects and symbolic values. *Revue archéologique* 57/1: 3–35.

Bredis, N.Yu. 2001. Issledovaniye skifskogo tekstilia nach. III v. do n.e. iz Bolshogo Ryzhanovskogo kurgana. *Vostochnoevropeiskij Archeologicheskij Zhurnal* 4/11 (July/August): http://archaeology.kiev.ua/journal/040701/bredis.htm

Brentjes, B. 1978. *Die iranische Welt vor Mohammad*. Leipzig: Koehler and Amelang.

Briant, P. 2002. *From Cyrus to Alexander: a History of the Persian Empire*. Winona Lake (IN): Eisenbrauns (revised edition; translated by P.T. Daniels).

Brill, R. 1999. *Chemical Analysis of Early Glasses. Volume 2: The Tables*. New York: Corning Museum of Glass.

Brinker, H.A. 2007. A Short History of the Museum Rietberg Zurich. *Orientations* 38/2 (March): 101–107.

Bronnikov, A. and K. Chugunov 2015. *Sokrovishcha Doliny tsarej Tuvy. Atlas-al'bom drevnego iskusstva*. Moscow / St Petersburg / Kyzyl: Kuzhuget Shojgu Foundation.

Brosseder, U. 2009. Xiongnu Terrace Tombs and Their Interpretation as Elite Burials, in J. Bemmann, H. Parzinger, E. Pohl and D. Tseveendorzh (eds) *Current Archaeological Research in Mongolia. Papers from the First International Conference on 'Archaeological Research in Mongolia', held in Ulaanbaatar, August 19th–23rd, 2007* (Bonn Contributions to Asian Archaeology 4): 247–80. Bonn: Vor- und Frühgeschichtliche Archäologie, Rheinische Friedrich-Wilhelms-Universität Bonn.

Brown, F. 1906. Otchet o raskopkah v Tavricheskoj gub. *Izvestiya arkheologicheskoy komissii* 19: 81–116. St. Petersburg.

Bruce, A.G. 1934. *Highway Design and Construction*. Scranton (PA): International Textbook Company.

Brunet, O. 2009. Bronze and Iron Age carnelian bead production in the UAE and Armenia: new perspectives. *Proceedings of the Seminar for Arabian Studies* 39: 57–68.

Bruyako, I.V. 1999. Mollyuski semeystva *Cypraea* i pamyatniki ranneskifskoy epokhi v Vostochnoy Evrope, in P.P. Tolochko (ed.) *Problemy skifo-sarmatskoy arkheologii Severnogo Prichernomorya*: 47–54. Zaporozhye: Zaporozhe State University Press.

Bruyako, I.V. 2005. *Rannie Kochevniki v Evrope (X–V vv. do R.H)*. Kishinev: Higher Anthropological School.

Bruyako, I.V. 2014. Pintadery rannego zheleznogo veka mezhdu Karpatami i Pontom. *Stratum plus* 2014/3: 39–49.

Buckley, M., M. Collins, J. Thomas-Oates and J. Wilson 2009. Species identification by analysis of bone collagen using matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry. *Rapid Communications in Mass Spectrometry* 23: 3843–54.

Buckley, M., S. Fraser, J. Herman, N.D. Melton, J. Mulville and A. Palsdottir 2014. Species identification of archaeological marine mammals using collagen fingerprinting. *Journal of Archaeological Science* 41: 631–41.

Bühler, G. 1896. *Indische Palaeographie. Von circa 350 a Chr. – circa 1300 p. Chr.* (Grundriss der Indo-Arischen Philologie und Altertumskunde 1/11). Strasbourg: Karl J. Trübner.

Buikstra, J. and D.H. Ubelaker (eds) 1994. *Standards for Data Collection from Human Skeletal Remains* (Arkansas Archeological Survey Research Series, 44). Arkansas: Arkansas Archeological Survey.

Bukowski, Z. 1977. *The Scythian Influence in the area of the Lusatian culture*. Zakład Narodowy im. Ossolińskich.

Bunker, E.C. 1988. Lost wax and lost textile: an unusual ancient technique for casting gold belt plaques, in R. Maddin (ed.) *The Beginning of the Use of Metals and Alloys. Papers from the Second International Conference on the beginning of the use of metals and alloys, Zhengzhou, China, 21–26 October 1986*: 2222–27. Cambridge (MA): Massachusetts Institute of Technology.

Bunker, E.C. 1991. The Chinese Artifacts among the Pazyryk Finds. *Source: Notes in the History of Art* 10/4: 20–24.

Bunker, E.C. 1992. Gold belts in the Siberian Treasure of Peter the Great: dates, origins and iconography, in G. Seaman (ed.) *Foundations of Empire – Archaeology and Art of the Eurasian Steppes* (Ethnographics Monograph Series No. 3): 201–22. Los Angeles: University of Southern California.

Bunker, E.C. 1993. Gold in the ancient Chinese world: a cultural puzzle. *Artibus Asiae* 53/1–2: 27–50.

Bunker, E.C. 1997. *Ancient Bronzes of the Eastern Eurasian Steppes from the Arthur M. Sackler Collection*. New York: Arthur M. Sackler Foundation.

Bunker, E.C. 2002. *Nomadic Art of the Eastern Eurasian Steppes: The Eugene V. Thaw and Other New York Collections*. New York: Metropolitan Museum of Art.

Bunker, E.C. and J. Ternbach 1970. A variation of the lost-wax process. *Expedition* 12/3: 41–42.

Bunker, E.C., T.S. Kawami, K.M. Linduff and Wu'en Yuesitu 1997. *Ancient Bronzes of the Eastern Eurasian Steppes from the Arthur M. Sackler Collections*. New York: The Arthur M. Sackler Foundation.

Bunyatyan, E.P. 1985. *Metodika socialnykh rekonstruktsiy v arkheologii. Na materiale skifskikh mogilnikov IV–III vv. do n.e.* Kiev: 'Naukova Dumka'.

Bunyatyan, K.P. and O.E. Fialko 2009. Skifskyi kurgan z rozmalyovanum sarkofagom. *Arkheologiya* 3: 55–69.

Burda, S. 1979. *Tezaure de aur din România*. Bucharest: Meridiane.

Burford, A. 1963. The Builders of the Parthenon. *Greece and Rome* 10: 23–35.

Busova, V.S. 2017. Tekstil iz kurganov skifskogo vremeni v doline reki Eerbek (Tsentralnaya Tuva). *Povolzhskaya arkheologiya* 3/21: 318–28.

Bylkova, V.P. 2005. Novaya nakhodka kompleksa amfor na Belozerskom poseleni. *Drevnosti 2005. Kharkovskiy istoriko-arkheologicheskiy ezhegodnik*: 256–67.

Bylkova, V.P. 2007*a*. *Nizhnee podneprov'e v antichnuyu epokhu (po materialam raskopok poseleniy)*. Kherson: Kherson University.

Bylkova, V.P. 2007*b*. Pozdneskifskie gorodischa Nizhnego Dnepra: problemy khronologii i atribucii. *Tyragetia* I [16]/1: 89–114.

Callieri, P. 2002. The Bactrian Seal of Khiṅgila. *Silk Road Art and Archaeology* 8: 121–41.

Callieri, P. 2004. India iii. Relations: Achaemenid period, in E. Yarshater (ed.) *Encyclopaedia Iranica* 13/1: 10–13.

Callieri, P. 2016. Sakas: in Afghanistan, in E. Yarshater (ed.) *Encyclopaedia Iranica*, accessed October 27 2017, <http://www.iranicaonline.org/articles/sakas-in-afghanistan>

Cambon, P. and J.-F. Jarrige (eds) 2006. *Afghanistan, les trésors retrouvés. Collections du musée national de Kaboul*. Paris: Éditions de la Réunion des musées nationaux and Musée national des Arts asiatiques-Guimet.

Campbell-Johnston, R. 2017. Dazzling trek through the treasures of a lost empire. *The Times* 13th September: 19.

Çamurcuoğlu, D.C. 2015. The technological study of the Çatalhöyük wall paintings (Turkey): Materials, Technologies and Artists. Unpublished PhD dissertation, University College London.

Çamurcuoğlu, D.C. 2018. Colourful Technologies: A Technical Study of the Colours on Çatalhöyük Wall Paintings, in R. Matthews and J. Curtis *et al.* (eds) *Proceedings of the 7th International Congress on the Archaeology of the Ancient Near East, 12–16 April 2010, the British Museum and UCL, London, Vol. 2: Ancient and Modern Issues in Cultural Heritage, Colour and Light in Architecture, Art and Material Culture, Islamic Archaeology*: 245–70. Wiesbaden: Harrassowitz.

Cardini, F. 1987. *Istoki srednevekovogo rytsarstva*. Moscow: 'Progress' (abridged translation from the Italian by V.P. Gaiduk).

Cardon, D. 2007. *Natural Dyes. Sources, Tradition, Technology and Science*. London: Archetype.

Cardon, D., C. Debaine-Francfort, A. Idriss, K. Anwar and Hu Xingjun 2013. Bronze Age Textiles of the North Cemetery: Discoveries made by the Franco-Chinese Archaeological Mission in the Taklamakan Desert, Xinjiang, China. *Archaeological Textiles Review* 55: 68–85.

Carter, A.K. and L. Dussubieux 2016. Geologic provenience analysis of agate and carnelian beads using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS): A case study from Iron Age Cambodia and Thailand. *Journal of Archaeological Science* 6 (April): 321–31.

Caspari, G., Sadykov, T., Blochin, J. and I. Hajdas 2017. Tunnug 1 (Arzhan 0) – an early Scythian kurgan in Tuva Republic, Russia. *Archaeological Research in Asia* 15: 82–87.

Çay, A.M. and I. Durmuş 2002. Scythians, in H. Güzel, C.G. Oğuz and O. Karatay (eds) *The Turks: Early Ages*: vol. 1, 147–66. Ankara: Yeni Türkiye Publications.

Cereti, C.G. 1995. *The Zand ī Wahman Yasn. A Zoroastrian Apocalypse* (Serie Orientale Roma, 75). Rome: IsMEO.

Cereti, C.G. 2010. *Xiiaona-* and *Xyōn* in Zoroastrian texts, in M. Alram *et al.* (eds) *Coins, Art and Chronology II*: 59–72. Vienna: Austrian Academy of Sciences.

Chadwick, J. and W.N. Mann 1978. Medicine, in G.E.R. Lloyd (ed.) *Hippocratic Writings*: 61–276. London: Penguin Classics (revised edition).

Chahlia, N. 2009. Effect of Capparis decidua on hypolipidemic activity in rats. *Journal of Medicinal Plants Research* 3/6: 481–84.

Chakrabati, D.K. and P. Moghadam 1977. Some unpublished Indus Beads from Iran. *Iran* 15: 166–68.

Chakravarti, R. 2016. Kushan empire, in J. MacKenzie (ed.) *The Encyclopaedia of Empire* 3: 1290–295. Chichester: Wiley-Blackwell.

Chang, C. and H.A. Koster 1986. Beyond Bones: Toward an Archaeology of Pastoralism. *Advances in Archaeological Method and Theory* 9: 97–148.

Charles-Gaffiot, J. and H. Lavagne (eds) 1999. *Hadrien: trésors d'une villa impériale*. Milan: Electa.

Chateaubriand, F.-R., vicomte de 1849/50. *Mémoires d'outre-tombe*. Paris: E. and V. Penaud.

Chatty, D. 1996. *Mobile Pastoralists.Development Planning and Social Change in Oman*. New York: Columbia University Press.

Chavannes, E. 1903. Voyage de Song Yun dans l'Udyāna et le Gandhāra. *Bulletin de l'Ecole française d'Extrême-Orient* 3: 379–441.

Chechushkov, I.V. and A.V. Epimakhov 2018. Eurasian Steppe Chariots and Social Complexity During the Bronze Age. *Journal of World Prehistory* 31: 435–83.

Chen, H.L., K.A. Jakes and D.W. Foreman 1998. Preservation of Archaeological Textiles through Fibre Mineralization. *Journal of Archaeological Science* 25: 1015–21.

Cheremisin, D.V. 2005. O semantike maskirovannykh rogatykh loshadey iz pazyrykskikh kurganov. *Arkheologiya, Etnografiya i Antropologiya Evrazii* 22 (2005/2): 129–40.

Cheremisin, D.V. 2008*a*. *Iskusstvo zverinogo stilya v pogrebalnykh kompleksakh ryadovogo naseleniya pazyrykskoy kultury: Semantika zverinykh obrazov v kontekste pogrebalnogo obryada*. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Cheremisin, D.V. 2008*b*. K semantike obraza kljuvogolovogo olenja v pazyrykskom iskusstve, in D.G. Savinov and O.S. Sovetova (eds) *Tropoju tysjacheletij. K jubileju M. A. Devlet* (*Trudy Sibirskoy Assotsiatsii issledovateley pervobytnogo iskusstva)*: vol. IV, 99–105. Kemerovo: Kuzbassvuzizdat.

Chernenko, E.V. 1968. *Skifskiy dospek*. Kiev: Ukrainian Academy of Sciences.

Chernenko, E.V. 1981. *Skifskiy luchniki*. Kiev: Ukrainian Academy of Sciences.

Chernenko, E.V. 2006. *Die schutzwaffen der Skythen*. Stuttgart: Franz Steiner.

Chernikov, S.S. 1965. *Zagadka zolotogo kurgana*. Moscow: Russian Academy of Sciences.

Chernova, O.F. and V.S. Busova 2016. Identifikatsiya fragmentov mekhovoy odezhdy iz kurganov skifskogo vremeny s teritorii Tsentralnoy Tuvy. *Arkheologicheskie Vesty* 22: 52–61.

Chernova, O.F. and T.N. Tselikova 2004. *Atlas volos mlekopitajuschih. Tonkaja struktura ostevyh volos i igl v skanirujuschem elektronnom mikroskope*. Moscow: KMK Scientific Press Ltd.

Chernova, O.F., T.V. Perfilova, A.B. Kiladze, F.A. Zhukova, V.M. Novikova and T.I. Marakova 2011. *Atlas mikrostruktury volos mlekopitayushchih – obyektov biologicheskoj ekspertizy*. Moscow: EKOM.

Chernykh, E.N. 1992. *Ancient metallurgy in the USSR. The Early Metal Age*. Cambridge: Cambridge University Press.

Chernykh, L.A. and M.N. Daragan (eds) 2014. *Kurgany epokhi eneolita-bronzy mezhdurechia Bazavluka. Chertomlyka* (Kurgane der Ukraine 4). Kiev: Izdatel Oleg Filyuk.

Chevalier, J., M.-L. Inizan and J. Tixier 1982. Une technique de perforation par percussion de perles en cornaline (Larsa, Iraq). *Paléorient* 8/2: 55–65.

Chizhova, A.A. 2004. Motiviye rospisi serdolikovykh bis v rannem srednevekov'ye (nakhodki na severnom Kavkaze), in *Izobrazitel'nyy pamyatniki: stili, epokha, kompozitsi (1-4 dekabr 2004)*: 180–83. St. Petersburg: St. Petersburg State University.

Chlenova, N.L. 1967. *Proiskhozhdenie i rannyaya istoriya plemen tagarskoy kultury*. Moscow: Russian Academy of Sciences.

Chlenova, N.L. 1981*a*. Svyazi kultur zapadnoy Sibiri s kulturami Priuralya i Srednego Povolzhya v kontse epokhi bronzy i nachale zheleznogo veka, in T.N. Troitskaya (ed.) *Problemy zapadnosibirskoy arkheologii: epokha zheleza*: 4–42. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Chlenova, N.L. 1981*b*. Tagarskie loshadi (o svyazyah plemen Yuzhnoi Sibiri i Srednei Azii v skifskuyu epokhu), in B.A. Litvinsky (ed.) *Kavkaz i Srednyaya Aziya v drevnosti i srednevekove (istoriya i kultura)*: 80–94. Moscow: Russian Academy of Sciences.

Chochorowski, J. and S. Skory 1997. Die Zentralbestattung des Grabhügels von Ryzanovka im rechtsseitigen Teil des ukrainichen Waldsteppengebietes, in V. Lungu and G. Simion (eds) *Actes du IIIe Colloque International d'Archéologie Funéraire*: 105–22. Tulcea: Institutul de Cercetări Eco-Muzeale.

Chologauri, L., A. Gabunia, L. Mowat, S.M.N. Priestman, E.W. Sauer, St J. Simpson and S. Stetkiewicz 2020. The small objects and other finds, in E.W. Sauer, L. Chologauri, A. Gabunia, K. Hopper, D. Lawrence, E. Macdonald, M. Mashkour, F.A. Mowat, D. Naskidashvili, K. Pitskhelauri, S.M.N. Priestman, L. Shumilovskikh, St J. Simpson, A. Tiliakou, Y. Abe, C.M. Batt, G. Gagoshidze, B. Gilmour, D.P. Greenwood, C. Pickard, I. Poole, V. Radu, L. Snape, J. Riley Snyder, E. Stoetzel, S. Amiribeirami, M.

Astolfi, I. Bailiff, S. Beizaee Doost, E. Bonato, B. Clavel, K. Debue, D. Decruyenaere, A. Diana, H. Fathi, R. Jajanidze, S. Kamjan, T. Kainaat, R. Khazaeli, E. Kranioti, M. Lemoine, G. Phlip, C. Shupe, R. Shikaku, B. Stern and S. Stetkiewicz *Dariali: 'The Caspian Gates' in the Caucasus from Antiquity to the Age of the Huns and the Middle Ages: The Joint Georgian-British Dariali Gorge Excavations and Surveys of 2013–2016* (British Institute of Persian Studies archaeological monograph series VI/2): 603–84. Oxford: Oxbow Books.

Chrisman-Campbell, K. 2015. *Fashion Victims: Dress at the Court of Louis XVI and Marie-Antoinette*. New Haven: Yale University Press.

Christian, D. 2000. Silk Roads or Steppe Roads? The Silk Roads in world history. *Journal of World History* 11/1 (March): 1–26.

Christie's, *Antiquities*. Catalogue of the auction held 2 July 1982. London: Christie's.

Chugunov, K.V. 2000. Bronzovyye nakonechniki strel skifskogo vremeni Tuvy, in A.B. Nikitin, S.V. Pankova, S.V. Khavrin and K.V. Chugunov (eds) *Mirovozzreniye. Arkheologiya. Ritual. Kultura. Sbornik statey k 60-letiyu M.L. Podolskogo*: 213–38. St. Petersburg.

Chugunov, K.V. 2004. Arzhan – istochnik, in O.A. Fedoseenko (ed.) *Arzhan. Istochnik v Doline carej. Arkheologicheskie otkrytiya v Tuve*: 10–39. St. Petersburg: Slavia.

Chugunov, K.V. 2005. Absolyutnaya khronologiya tagarskoy kultury – vzglyad izvne, in G.G. Korol (ed.) *Arkheologiya Yuzhnoy Sibiri: idei, metody, otkrytiya*: 102–104. Krasnoyarsk: Krasnoyarsk State Pedagogical University named after V.P. Astafyev.

Chugunov, K.V. 2008. Plity s petroglifami v komplekse kurgana Arzhan-2 (k khronologii arzhano-mayemirskogo stilya), in D.G. Savinov and O.S. Sovetova (eds) *Tropoyu tysyacheletiy: K yubileyu M.A. Devlet*: 53–69. Kemerovo: Kuzbassvuzizdat.

Chugunov, K.V. 2009. Arzhan-1 i Arzhan-2: sravnitelny analiz, in anon. (ed.) *Naslediye narodov Tsentralnoy Azii i sopredelnykh territoriy: izucheniye, sokhraneniye i ispolzovaniye. Materialy Mezhdunarodnoy nauchno-prakticheskoy conferentsii*: Part 1, 48–52. Kyzyl: 'Anyak' Kyzyl Education Centre.

Chugunov, K.V. 2010. Die Materialien aus Aržan 2 im Kontext der Periodisierung skythenzeitliche Denkmäler Tuvas, in K. Chugunov, H. Parzinger and A. Nagler (eds) *Der skythenzeitliche Fürstenkurgan Aržan 2 in Tuva* (Archäologie in Eurasien 26. Steppenvölker Eurasiens 3): 160–69. Mainz am Rhein: Philipp von Zabern.

Chugunov, K.V. 2011*a*. Arzhan-2: rekonstruktsiya etapov funktsionirovaniya pogrebalno-pominalnogo kompleksa i nekotoryye voprosy ego khronologii. *Rossiyskiya arkheologicheskiy yezhegodnik* 1: 262–335.

Chugunov, K.V. 2011*b*. Iskusstvo Arzhana-2: stilistika, compozitsiya, ikonografiya, ornamentalnye motivy, in D.A. Machinsky (ed.) *Evropeyskaya Sarmatiya*: 39–60. St. Petersburg: Nestor-Istoriya.

Chugunov, K.V. 2013. Aktual'nyye problemy khronologii pamyatnikov epokhi rannikh kochevnikov Tsentral'noy Azii i Sibiri. *Vestnik Tomskogo gosudarstvennogo universiteta: istoriya* 3/23: 97–102.

Chugunov, K.V. 2017. Issledovaniya kurgana 1 mogilnika Bugry v predgoryakh Altaya. *Arkheologichesky sbornik gosudarstvennogo Ermitazha* 41: 126–42.

Chugunov, K.V., A. Nagler and H. Parzinger 2006*a*. Arzhan-2: materialy epokhi bronzy, in D.G. Savinov and M.L. Podolsky (eds) *Okunevskiy sbornik 2: kultura i eye okruzheniye*: 303–11. St. Petersburg: St. Petersburg University Press.

Chugunov, K.V., A. Nagler and H. Parzinger 2006*b*. Discovery of a royal burial of the Scythian period in Tuva, in J. Aruz, A. Farkas and E. Valtz Fino (eds) *The Golden Deer of Eurasia. Perspectives on the Steppe Nomads of the Ancient World*: 128–31. New York: Metropolitan Museum of Art.

Chugunov, K., H. Parzinger and A. Nagler 2003. Der skythische Fürstengrabhügel von Aržan 2 in Tuva. Vorbericht der russisch-deutschen Ausgrabungen 2000–2002. *Eurasia Antiqua* 9: 113–62.

Chugunov, K., H. Parzinger and A. Nagler *et al.* 2010. *Der skythenzeitliche Fürstenkurgan Arzan 2 in Tuva* (Archäologie in Eurasien 2 / Steppenvölker Eurasiens 3). Mainz am Rhein: Philipp von Zabern.

Chugunov, K.V., T.V. Ryabkova and St J. Simpson 2017. Mounted warriors, in St J. Simpson and S. Pankova (eds) *Scythians: warriors of ancient Siberia*: 192–201. London: Thames and Hudson.

Clauson, G. 1959. Review of G. Vernadsky, *The Origins of Russia*. *Journal of the Royal Asiatic Society* 3/4: 166–67.

Clements, J. 2017. *A History of the Silk Road*. London: Haus Press.

Cohen, M.N. and G.J. Armelagos (eds) 1984. *Paleopathology at the Origins of Agriculture*. London: Academic Press.

Colburn, H.P. 2013. Connectivity and Communication in the Achaemenid Empire. *Journal of the Economic and Social History of the Orient* 56: 29–52.

Collins, P. 2008. *Assyrian palace sculptures*. London: British Museum Press.

Collis, J. 2014. Urbanisation in Temperate Europe in the Iron Age: Mediterranean Influence or Indigenous?, in M. Fernández-Götz, H. Wendling and K. Winger (eds) *Paths to Complexity: Centralisation and Urbanisation in Iron Age Europe*: 15–23. Oxford: Oxbow.

Collon, D. 1995. *Ancient Near Eastern Art*. London: British Museum Press.

Connolly, P. 1986. A Reconstruction of a Roman Saddle. *Britannia* 17: 353–55.

Connolly, P. 1987. The Roman Saddle, in M. Dawson (ed.) *Roman Military Equipment: the Sources of Evidence* (BAR International Series 336): 7–27. Oxford: British Archaeological Reports.

Connolly, P. 2001. *Gretsia i Rim. Entsiklopediya voyennoy istorii*. Moscow: EKSMO-Pres (translation from the English).

Connolly, P. and C. van Driel-Murray 1991. The Roman Cavalry Saddle. *Britannia* 22: 33–50, pls V–VII.

Conovici, N. 1998. *Les timbres amphoriques. 2. Sinope (tuiles timbres comprises)*. (Histria 8/2).

Conrad, J. 1993. *Lord Jim*. New York: The Modern Library.

Cooke, B. (ed.) 2000. *Imperial China. The Art of the Horse in Chinese History*. Lexington (KY): Kentucky Horse Park.

Cornevin, C. and F.-X. Lesbre 1894. *Traité de l'âge des animaux domestiques d'après les dents et les productions épidermiques*. Paris: Baillière.

Cousens, H. 1975. *The Antiquities of Sind, with historical outline*. Karachi: Oxford University Press (reprint).

Cowell, M. 1977. Energy dispersive X-ray fluorescence analysis of ancient gold alloys, in T. Hackens and H. McKerrell (eds) *X-Ray Microfluorescence Applied to Archaeology* (PACT 1): 76–85. Strasbourg: Council of Europe.

Craddock, P. 2009. *Scientific Investigation of Copies, Fakes and Forgeries*. Oxford: Butterworth-Heinemann.

Crawford, M.H. and W.R. Leonard 2002. The biological diversity of herding populations: an introduction, in W.R. Leonard and M.H. Crawford (eds) *Human Biology of Pastoral Populations*: 1–9. Cambridge: Cambridge University Press.

Crescioli, L. 2017. Necropoli o santuari? La dimensione funeraria, rituale e sociale dei kurgan sciti: nuovi dati dalla necropoli di Kaspan (regione del Semirech'è, Kazakhstan). Unpublished PhD thesis, University of Venice. http://dspace.unive.it/handle/10579/10263.

Cribb, J. 1985. The Sino-Kharoshthi coins of Khotan: their attribution and relevance to Kušān chronology, part 2. *Numismatic Chronicle* 145: 136–49.

Cribb, J. 1993. The 'Heraeus' coins, in M.R. Price (ed.) *Essays in Honour of R. Carson and K. Jenkins*: 107–34. London: Spink.

Cribb, J. 1999. The early Kushan kings: new evidence for chronology. Evidence from the Rabatak inscription of Kanishka I, in M. Alram and D.E. Klimburg-Salter (eds) *Coins, Art, and Chronology. Essays on the pre-Islamic History of the Indo-Iranian Borderlands*: 177–205. Vienna: Austrian Academy of Sciences.

Cribb, J. 2010. The Kidarites, the numismatic evidence. With an analytical appendix by A. Oddy, in M. Alram *et al.* (eds) *Coins, Art and Chronology II*: 91–146. Vienna: Austrian Academy of Sciences.

Cribb, R. 1991. *Nomads in Archaeology*. Cambridge: Cambridge University Press.

Crișan, I.H. 1986. *Spiritualitatea geto-dacilor*. Bucharest: Albatros.

Crone, P. 1991. Kavād's Heresy and Mazdak's Revolt. *Iran* 29: 21–42.

Crouwel, J.H. 2012. Metal wheel tyres from the ancient Near East and Central Asia. *Iraq* 74: 89–95.

Crowell, B.L. 2007. Nabonidus, as-Sila', and the Beginning of the End of Edom. *Bulletin of the American Schools of Oriental Research* 348 (November): 75–88.

Cunliffe, B. 1988. *Greeks, Romans, and Barbarians: Spheres of Interaction*. London: Batsford.

Cunliffe, B. 2015. *By Steppe, Desert, and Ocean. The Birth of Eurasia.* Oxford: Oxford University Press.

Cunliffe, B. 2019. *The Scythians. Nomad Warriors of the Steppe.* Oxford: Oxford University Press.

Cunningham, J.S. and E. Henson (eds) 1998. *Christopher Marlowe, Tamburlaine the Great*. Manchester: Manchester University Press.

Curl, J.S. (ed.) 1994. *Egyptomania. The Egyptian Revival: a Recurring Theme in the History of Taste*. Manchester and New York: Manchester University Press.

Curtis, J. 1990. *Ancient Persia*. London: British Museum Press.

Curtis, J. 1998. A Chariot Scene from Persepolis. *Iran* 36: 45–51.

Curtis, J. 2013. *An Examination of Late Assyrian Metalwork with special reference to Nimrud*. Oxford: Oxbow.

Curtis, J. and M. Kruszyński 2002. *Ancient Caucasian and Related Material in the British Museum* (British Museum Occasional Papers 121). London: The British Museum.

Curtis, J. and N. Tallis (eds) 2005. *Forgotten Empire. The World of Ancient Persia*. London: The British Museum.

Daffinà, P. 1967. *L'immigrazione dei Saka nella Drangiana*. Rome: Istituto Italiano per il Medio ed Estremo Oriente.

Daim, F., K. Kaus and P. Tomka (eds) 1996. *Hunnen und Awaren. Reitervölker aus dem Osten. Begleitbuch und Katalog*. Eisenstadt: Burgenländischen Landesregierung.

Dalton, O.M. 1964. *The Treasure of the Oxus with other examples of early Oriental metal-work*. London: The British Museum.

Dan, A. 2013. The Black Sea as a Scythian Bow, in M. Manoledakis (ed.) *Exploring the Hospitable Sea. Proceedings of the International Workshop on the Black Sea in Antiquity held in Thessaloniki, 21–23 September 2012* (BAR International Series 2498): 39–58. Oxford: British Archaeological Reports.

Dandamaev, M.A. 1982. Sakski matrosy. *Iranica Antiqua* 17: 101–103.

Dandamayeva, M. and G. Brereton (eds) 2019. *'A osnoval tam svoy korolevskiy dvorets': assiriyskoye iskusstvo iz Britanskogo muzeya ['And he founded therein his royal palace': Assyrian art from the British Museum]*. St. Petersburg: State Hermitage Museum.

Dani, A.H. 1986*a*. *Indian Palaeography*. New Delhi: Munshiram Manoharlal.

Dani, A.H. 1986*b*. *The Historic City of Taxila*. Paris and Tokyo: UNESCO and The Centre for East Asian Cultural Studies.

Danilicheva, E.V. (ed.) 2016. *Armenia. Legenda bytiya*. Moscow: 'Pareto-print' Press.

Danilova, I.E., M.Yu. Treister and I.E. Pruss (eds) 1996. *Sokrovischa Troi iz raskopok Genriha Shlimana*. Moscow: Leonardo Arte.

Danov, H. 1976. *Tracia Antică*. Bucharest: Editura Științifică și Enciclopedică.

Daragan, M.N. 2013. Kurgany stepnoy chasti Ukrainy: prostranstvennyy analiz i vizualizatsiya metodami GIS–tekhnologiy, in D.Yu. Hookk (ed.) *Virtualnaya arkheologiya (nerazrushayushchiye metody issledovaniy. modelirovaniye. rekonstruktsii). Materialy Pervoy Mezhdunarodnoy konferentsii. Sostoyavsheysya v Gosudarstvennom Ermitazhe 4–6 iyunya 2012 g.*: 76–85. St. Petersburg: State Hermitage Publishing House.

Daragan, M.N. 2014. Prostranstvennyy analiz arkheologicheskikh pamyatnikov mezhdurechia Bazavluk–Solenaya–Chertomlyk, in L.A. Chernykh and M.N. Daragan (eds) *Kurgany epokhi eneolita-bronzy mezhdurechia Bazavluka. Chertomlyka* (Kurgane der Ukraine 4): 367–448. Kiev: Izdatel Oleg Filyuk.

Daragan, M.N. 2016*a*. Nakonechniki strel predskifskogo i ranneskifskogo vremeni: tekhnologiya izgotovleniya. *Metrologiya i markirovka. Trudy gosudarstvennogo Ermitazha 77* ('Arkheologiya bez granits. Kollektsii, problemy, issledovaniya, gipotezy'): 127–70.

Daragan, M.N. 2016*b*. Scythian internecine feuds. *Ancient Civilizations from Scythia to Siberia* 22: 96–140.

Daragan, M.N. 2017*a*. O formirovanii skifskikh kolchannykh naborov vtoroĭ poloviny VI v. do n.e. *Stratum plus* 2017/3: 51–112.

Daragan, M.N. 2017*b*. Krupnye gorodishcha skifskogo vremeni v ukrainskoy lesostepi (osobennosty raspolozheniya), in S.A. Skory (ed.) *Arkheologia i davnya istoria Ukrainy* 23/2: 397–427.

Daragan, M.N. 2018. Prostranstvennaya harakteristika Aleksandropolskogo kurgana, in S.V. Polin and A.Yu. Alekseev (eds) *Skifskiy tsarskiy Aleksandropolskiy kurgan IV v. do n.e. v Nizhnem Podneprovye* (Kurgany Ukrainy 6): 732–40. Kiev: 'Naukova Dumka'.

Daragan, M., M. Gleba and O. Buravchuk 2016. 'Pandora's box': a textile tool set from a Scythian burial in Ukraine, in C. Alfaro, J. Ortiz, L. Turell and M.J. Martínez (eds) *Purpureae Vestes V, Ancient Textiles, Basketry and Dyes in the Ancient Mediterranean World*: 57–62. Valencia: University of Valencia Press.

Darmesteter, J. 1898. *The Zend Avesta*. New York: The Christian Literature Copmany.

Daryaee, T. 2009. *Sasanian Persia. The Rise and Fall of an Empire*. New York: I.B. Tauris.

Das Anlitz des Fremden 2012. Eine Ausstellung des Kunsthistorischen Museums Wien in Kooperation mit dem Bernischen Historischen Museum und der Collection Jean-Pierre Righetti (Schweiz). http://pro.geo.univie.ac.at/projects/khm/?lanuage=de

Dashevskaya, O.D. 1991. *Pozdnie skify v Krymu*. Moscow: Russian Academy of Sciences.

David, A.R. and M.R. Zimmerman 2010. Cancer: an old disease, a new disease or something in between? *Nature Reviews Cancer* 10: 728–33.

Davidson, O.M. 2013. *Poet and Hero in the Persian Book of Kings*. Boston and Washington, DC: Ilex Foundation Centre for Hellenic Studies (third edition).

Davydova, A.V. 1995. *Ivolginsky Arkheologichesky Kompleks: Tom. 1, Ivolginskoye gorodishche / Arkheologicheskiye pamyatniki syunnu. Vyp. 1*. St. Petersburg: St. Petersburg Oriental Studies.

Davydova, A.V. 1996. *Ivolginsky Arkheologichesky Kompleks: Tom. 2, Ivolginskoye Mogilnik*. St. Petersburg: St. Petersburg Oriental Studies.

Davydova, L.I. 1990. *Bosporskiye nadgrobnye relyefy V v. do n.e.–III v. n.e. Katalog vystavki*. Leningrad: State Hermitage Museum.

Dawson, T. and G. Sumner 2015. *By the Emperor's Hand: Military Dress and Court Regalia in the Later Romano-Byzantine Empire*. Oxford: Oxbow.

Debaine-Francfort, C. 1990. Les Saka du Xinjiang avant les Han (266 av.–220 ap. J.-C.): critères d'identification, in H.-P. Francfort (ed.) *Nomades et sédentaires en Asie centrale. Apports de l'archéologie and de l'ethnologie (Actes du colloque franco-soviétique d'Alma-Ata (Kazakhstan) 17–26 octobre 1987*: 81–95. Paris: Éditions du CNRS.

Debaine-Francfort, C. and A. Idriss (eds) 2001. *Keriya, mémoires d'un fleuve: Archéologie et civilisation des oasis du Taklamakan* (Mission archéologique franco-chinoise au Xinjiang / Patrimoines d'Orient). Paris: Éditions Findakly.

De Blois, F. 2012. A new look at Mazdak, in A.J. Silverstein and T. Bernheimer (eds) *Late Antiquity: Eastern Perspectives*: 12–20. Cambridge: Gibb Memorial Trust.

Dedyulkin, A.V. 2015. Materialy iz pogrebenija, issledovannogo v 1973 g. v g. Novocherkasske, iz Fondov Muzeja istorii donskogo kazachestva, in V.A. Korenjako and A.L. Bojko (eds) *Za rekoy Tanaisom. Sbornik pamjati V.E. Maksimenko (1939–2014)*: 71–72. Rostov-on-Don: JuFU.

De Menasce, J. 1960. Déchiffrement de motifs alphabétiques de l'époque sassanide. *Bulletin de l'Institut Française d'Archéologie Orientale* 59: 309–14.

Demidenko, S.V. 2007. Ob odnom iz aspektov 'problemy III v. do n.e.' v sarmatskoj arkheologii. *Rossiyskaya Arkheologiya* 2007/2: 48–54.

Demidenko, S.V. 2008. *Bronzovyye kotly drevnikh plemen Nizhnego Povolzh'ya i Yuzhnogo Priural'ya (V v. do n.e.–III v. n.e.)*. Moscow: Publishing House of LKI.

Demidenko, S.V. 2010. Rannesarmatskoe pogrebenie iz mogilnika Verhnij Eruslan – nikakih 'oksyumoronov'. *Nizhnevolzhskij arkheologicheskij vestnik* 11: 365–73.

Derevyanko, A.P. and V.I. Molodin 2000. *Fenomen altaiskikh mumi*. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Derevyanko, A.P. and V.I. Molodin (eds) 2016. *Altay v krugu evraziyskikh drevnostey*. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Dergachev, V.A. 1997. *Metallicheskie izdeliya k probleme genezisa kultur rannego galshtata Karpato-Danubio-Nordpontiyskogo regiona.* Kishinev: Institute of Archaeology.

Desyatchikov, Yu.M. 1972. Katafraktariy na nadgrobii Afeniya. *Sovetskaya Arkheologiya* 1972/4: 68–77.

Devlet, M.A. 1966. Plemena basseyna Srednego Eniseya v rannem zheleznom veke. Unpublished PhD dissertation, University of Moscow.

Devlet, M.A. 1968. Iz istorii osvoeniya metallurgii zheleza na Srednem Enisee. *Sovetskaya Arkheologiya* 1968/1: 28–38.

De Waele, A. and E. Haerinck 2006. Etched (carnelian) beads from northeast and southeast Arabia. *Arabian Archaeology and Epigraphy* 17/1 (May): 31–40.

DeWeese, D. 2011. Islam in Central Asia, in I. Hareir and R. M'Baye (eds) *The Different Aspects of Islamic Culture: the Spread of Islam throughout the World*: vol. 3, 721–34. Paris: UNESCO.

Dezsö, T. 2012. *The Assyrian Army. The Structure of the Neo-Assyrian Army II. Cavalry and Chariotry*. Budapest: Eötvös University Press.

DGS 1866*a*. *Drevnosti Gerodotovoj Skifii. Sbornik opisanij arkheologicheskih raskopok i nahodok v Chernomorskih stepjah*. St. Petersburg: Printing House of the Imperial Academy of Sciences.

DGS 1866*b*. *Drevnosti Gerodotovoj Skifii. Sbornik opisanij arkheologicheskih raskopok i nahodok v Chernomorskih stepjah, Tabl. I–XXI*. St. Petersburg: Printing House of the Imperial Academy of Sciences.

Dhakad, P.K., P.K. Sharma and S. Kumar 2016. A Review on Ethnobiological and Medicinal Potential of Capparaceae Family Plant: Capparis decidua (Forssk.) Edgew. *Advances in Pharmacology and Pharmacy* 4/3: 27–39.

Diakonova, V.P. 1970. Bolshiye kurgany-kladbishcha na mogilnike Kokel (po rezultatam raskopok za 1963, 1965 gg.), in L.P. Potapov (ed.) *Trudy Tuvinskoy kompleksnoy arkheologo-etnograficheskoy ekspeditsii III. Materialy po arkheologii i etnografii mogilnika Kokel*: 80–209. Moscow and Leningrad: Russian Academy of Science Publishing House.

Diatroptov, P.D. 2001. Izobrazheniye vsadnikov v antichnom Severnom Prichernomorye, in I.I. Guschina and D.V. Zhuravlev (eds) *Pozdniye skify Kryma* (Trudy gosudarstvennogo Istoricheskogo Muzeya 118). Moscow: State Historical Museum.

Dickens, M. 2018. Khotan (Yutian); Khotanese language and literature; Sarmatians (Sauromatians); Scythians (Saka); Tarim Basin, in O. Nicholson (ed.) *The Oxford Dictionary of Late Antiquity*: vol. 2, 863, 863, 1334, 1346–47, 1454. Oxford: Oxford University Press.

Dickinson, G. and L. Wrigglesworth 2000. *Imperial Wardrobe*. London: Ten Speed Press.

Di Cosmo, N. 1994. Ancient Inner Asian nomads: their economic basis and its significance in Chinese history. *Journal of Asian Studies* 53: 1092–126.

Di Cosmo, N. 2002. *Ancient China and Its Enemies: The Rise of Nomadic Power in East Asian History*. Cambridge: Cambridge University Press.

Dietler, M. 2010. *Archaeologies of Colonialism: Consumption, Entanglement, and Violence in Ancient Mediterranean France*. Berkeley: University of California Press.

Dikshit, M.G. 1949. *Etched Beads in India. Decorative Patterns and the Geographical Factors in their Distribution*. Poona: Deccan College.

Dmitriev, A.V. 1979. Pogrebeniye vsadnikov i boevykh koney v mogilnike epokhi pereseleniya narodov na r. Dyurso bliz Novorossiyska. *Sovetskaya Arkheologiya* 1979/11: 212–29.

Dong Gao 1995. Gongyuan 3 zhi 6 shiji Murong Xianbei, Gaojuli, Chaoxian, Riben maju zhi bijiao yanjiu [A comparative study on the horse fittings of Murong Xianbei, Gaojouli, Korea and Japan]. *Wenwu* 10: 34–42.

Doulgeri–Intzessiloglou, A. and Y. Garlan 1990. Vin et amphores de Peparethos et d'Ikos. *Bulletin de Correspondance Hellénique* 114/1: 361–89.

Dovatur, A.I., D.P. Kallistov and I.A. Shishova 1982. *Narody nashey strany v 'Istorii' Gerodota. Teksty, perevod, kommentariy*. Moscow: Russian Academy of Sciences.

Driel-Murray, C. van, P. Connolly and J. Duckham 2004. Roman saddles: archaeology and experiment 20 years on, in L. Gilmour (ed.) *In the Saddle: an exploration of the saddle through history*: 1–20. London: Archetype Publications.

Duan Qingbo 2015*a*. Cong Qin Shihuang ling kaogu kan Zhongxi wenhua jiaoliu (1) [The cultural interaction between East and West: from the perspective of the archaeological findings of the mausoleum of Qin Shi Huang (1)]. *Xibei daxue xuebao* 45/1: 8–15.

Duan Qingbo 2015*b*. Cong Qin Shihuang ling kaogu kan Zhongxi wenhua jiaoliu (2) [The cultural interaction between East and West: from the perspective of the archaeological findings of the mausoleum of Qin Shi Huang (2)]. *Xibei daxue xuebao* 45/2: 8–14.

Duan Qingbo 2015*c*. Cong Qin Shihuang ling kaogu kan Zhongxi wenhua jiaoliu (3) [The cultural interaction between East and West: from the perspective of the archaeological findings of the mausoleum of Qin Shi Huang (3)]. *Xibei daxue xuebao* 45/3: 8–13.

Dubin, L.S. 1987. *The History of Beads from 30,000 BC to the Present*. London: Thames and Hudson.

Dudarev, S.L. 2011. Mogilnik 'Lermontovskaya skala (u reki)' – pamyatnik rannezheleznogo veka Pyatigorya, in V.B. Vinogradov (ed.) *Sbornik nauchnykh rabot S.L. Dudareva: stati, materialy, retsenzii*: 233–60. Moscow: Ileksa.

Dumezil, G. 1990. *Skify Narty*, Moscow: Nauka.

Dumont, L. 1970. *Homo Hierarchicus*. Chicago: University of Chicago Press.

Durando, F. 2005. *Greece. Splendors of an Ancient Civilization.* London: Thames and Hudson.

During Caspers, E.C.L. 1972. Etched carnelian beads. *Bulletin of the Institute of Archaeology* 8/9: 83–98.

Durkheim, É. 1964. *The Division of Labor in Society*. New York: New York Free Press of Glencoe (First Free Press paperback edition).

Dusinberre, E. 2008. Circles of Light and Achaemenid styles in Gordion's Seal 100, in N. Cahil (ed.) *Love for Lydia: a Sardis Anniversary Volume Presented to Crawford H. Greenewalt, Jr* (Archaeological Exploration of Sardis 4): 87–98. Cambridge [MA] and London: Harvard University Press.

Dusinberre, E. 2010. Anatolian Crossroads: Achaemenid Seals from Sardis and Gordion, in J. Curtis and St J. Simpson (eds) *The World of Achaemenid Persia. History, Art and Society in Iran and the Ancient Near East*: 323–25. London: I.B. Tauris.

Dusinberre, E. 2013. *Empire, Authority, and Autonomy in Achaemenid Anatolia*. Cambridge: Cambridge University Press.

Dussubieux, L. and B. Gratuze 2003. Nature et origine des objets en verre retrouvés à Begram (Afghanistan) et à Bara (Pakistan), in O. Boperarachchi, C. Landes and C. Sachs (eds) *De l'Indus a l'Oxus. Archeologie de l'Asie Centrale*: 315–37. Lattes: Association IMAGO and musée de Lattes.

Edwardes, M. 1996. Searching for the Scythians. *National Geographic* 190/3: 54–79.

Edwardes, M. 2003. Masters of Gold. *National Geographic* 203/6: 112–29.

Effenberger, A., B. Marshak, V. Zalesskaya and I. Zaseckaya 1978. *Spätantike und früh-byzantinische Silbergefäße aus der Staatlichen Ermitage Leningrad. Ausstellung der Staatlichen Ermitage Leningrad in der Frühchristlich-byzantinischen Sammlung der Staatlichen Museen zu Berlin, Dezember 1978 bis März 1979*. Berlin: Staatliche Museen zu Berlin.

Eger, C. 2010. Indisch, Persisch oder Kaukasisch? Zu den Karneolperlen mit Ätzdekor der Gruppe C nach Beck und den östlichen Fernkontakten der Provinz Arabien. *Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz* 57: 221–78.

Egg, M. and C. Pare 1995. *Die Metallzeiten in Europa und im Vorderen Orient. Die Abteilung Vorgeschichte im Römisch-Germanischen Zentralmuseum* (Kataloge vor- und frühgeschichtlicher Altertümer 26). Mainz am Rhein: Verlag des Römisch-Germanischen Zentralmuseums.

Elagina, N.G. 1959. Skifskie antropomorfnye stely Nikolaevskogo muzeya. *Sovetskaya Arkheologiya* 1959/2: 187–96.

Elizarenkova, T.Ya. 1999. *Slova i Weschi v Rigvede*. Moscow: Vostochnaya Literatura.

Elizarenkova, T.Ya. 2007. *Atharvaveda (Shaunaka). Knigi VIII–XII. Perevod s Vediiskogo Yazyka, Vstupitel'naya stat'ya, Kommentarii i Prilozheniya* (Atharvaveda / Saunaka): vol. 2. Moscow: Vostochnaya Literatura (in three volumes).

Eluére, C. 1989. *Secrets of Ancient Gold*. Düdingen: Trio.

Emery, I. 1994. *The Primary Structures of Fabrics: An Illustrated Classification*. London: Thames and Hudson (third edition).

Emmerick, R.E. 1968. *Saka Grammatical Studies*. London: Oxford University Press.

Emmerick, R.E. 1979 [1983]. The historical importance of the Khotanese manuscripts, in J. Harmatta (ed.) *Prolegomena to the Sources on the History of Pre-Islamic Central Asia*: 167–77. Budapest: Akadémiai Kiadó.

Emmerick, R.E. 1983*a*. The Iranian settlements to the east of the Pamirs, in E. Yarshater (ed.) *The Cambridge History of Iran: the Seleucid, Parthian and Sasanian Periods*: vol. 3/1, 263–75. Cambridge: Cambridge University Press.

Emmerick, R.E. 1983*b*. Buddhism among Iranian peoples, in E. Yarshater (ed.) *The Cambridge History of Iran: the Seleucid, Parthian and Sasanian Periods*: vol. 3/2, 949–64. Cambridge: Cambridge University Press.

Emmerick, R.E. 1989. Buddhism in Central Asia, in J. Kitagawa and M. Cummings (eds) *Buddhism and Asian History: Religion, History, and Culture. Selections from the Encyclopaedia of Religion*: 131–37. London: MacMillan-Collier.

Emmerick, R.E. 1990. Buddhism among Iranian peoples, i. in pre-Islamic times, in E. Yarshater (ed.) *Encyclopaedia Iranica* 4: 492–96. London: Routledge and Kegan Paul.

Emmerick, R.E. 1992. *A Guide to the Literature of Khotan*. Tokyo: The International Institute for Buddhist Studies (second edition).

Emmerick, R.E. 2001. Harold Walter Bailey 1899–1996, in C.E. Bosworth (ed.) *A Century of British Orientalists 1902–2001*: 10–48. Oxford: Oxford University Press.

Emmerick, R.E. 2002. Hunting the hapax: Sir Harold Bailey (1899–1996), in N. Sims-Williams (ed.) *Indo-Iranian Languages and Peoples* (Proceedings of The British Academy 116): 1–17. Oxford: Oxford University Press.

Emmerick, R.E. 2012. Khotanese and Tumshuqese, in G. Windfuhr (ed.) *The Iranian Languages*: 377–415. London: Routledge.

Enoki, K., G.A. Koshelenko and Z. Haidary 1999. The Yüeh-chih and their migrations, in J. Harmatta, B.N. Puri and G.F. Etemady (eds) *History of civilizations of Central Asia: the development of Sedentary and Nomadic civilizations, 700 B.C. to A.D. 250*: Vol. II, 171–89. New Delhi: Motilal Banarsidass Publishers.

Eraly, A. 2007. *The Mughal World. India's Tainted Paradise*. London: Batsford.

Erdenechuluun P. and D. Erdenebaatar 2011. *The Sword of Heaven. Culture of Bronze Artifacts of the Bronze Age and Hunnu Empire*. Ulaanbaatar.

Erdy, M. 2003/04. Art objects from the Sidorovka Kurgan Cemetery and the Analysis of its Ethnic Affiliation. *SAPAR Bulletin* 6/7: 48–52.

Erlikh, V.R. 2007. *Severo-Zapadny Kavkaz v nachale zheleznogo veka*. Moscow: Russian Academy of Sciences.

Erlikh, V.R., A.P. Kantorovich and V.E. Maslov 2015. Spornye voprosy khronologii Arkhaicheskoy Skifii. *Vestnik Rossiyskogo gumanitarnogo nauchnogo fonda* 78/1: 73–82. Moscow: Publishing House of the Federal State budget organisation Russian Humanitarian Scientific Foundation.

Errington, E. 2010. Differences in the patterns of Kidarite and Alchon coin distribution at Begram and Kashmir Smast, in M. Alram *et al.* (eds) *Coins, Art and Chronology II*: 147–68. Vienna: Austrian Academy of Sciences.

Errington, E. 2017. *Charles Masson and the Buddhist Sites of Afghanistan: Explorations, Excavations, Collections 1832–1835* (British Museum Research Publications 215). London: The British Museum.

Ertug, A. and P. Baker 2000. *Silks for the Sultans: Ottoman Imperial Garments from the Topkapı Palace*. Istanbul: Ertuğ and Kocabiyik.

Ervynck, A. 1995. Les restes animaux du kourgan scythe de Kizil (monts Altaï, Sibérie). *Bulletin des Musées Royaux d'Art et d'Histoire* 66: 141–50.

Esin, Yu.N., J. Magay, E. Rousellier and F. Walter 2014. Kraska v naskal'nom iskusstve okunevskoy kul'tury Minusinskoy kotloviny. *Rossiyskaya Arkheologiya* 2014/3: 79–88.

Esin, Yu.N. (ed.) 2017. *Naskalnye izobrazheniya Oglakhty. Album*. Abakan: State National Reserve 'Khakassky'.

Evans-Pritchard, E.E. 1940. *The Nuer*. Oxford: Oxford University Press.

Falk, H. 2001. Names and weights inscribed on some vessels from the silver hoard. *Journal des Savants* 2001/2: 308–19.

Falk, H. 2014. The alleged Kharoṣṭhī-Brāhmī mixed script and some new seals from Bengal. *Zeitschrift für Indologie und Südasienstudien*: 105–24.

Falk, H. 2015. *Kushan Histories. Literary Sources and Selected Papers from a Symposium at Berlin, December 5 to 7, 2013*. Bremen: Hempen Verlag.

Farkas, A. 1973. Sarmatian Roundels and Sarmatian Art. *Metropolitan Museum Journal* 8: 77–88.

Farris, W. 1996. *Heavenly Warriors: The evolution of Japan's Military, 500–1300*. Cambridge (MA): Harvard University Press.

Fassbinder, J.W.E. 2016. Magnetometerprospektion sakischer Kurgane: Das Gräberfeld Žoan Tobe mit einem Großkurgan und der Kurgan bei Kegen, Süd-Ost Kasachstan, in A. Gass (ed.) *Das Siebenstromland zwischen Bronze- und Früheisenzeit. Eine Regionalstudie* (TOPOI. Berlin Studies of the Ancient World 28): 520–37. Berlin and Boston: Walter de Gruyter.

Fassbinder, J.W.E., Gass, A., Hofmann, I., Belinskiy, A.B. and Parzinger H. 2015*a*. Early Iron Age kurgans and their periphery: Latest findings and interpretations from the northern Caucasus, in D.Yu. Hookk (ed.) *Virtual Archaeology (Methods and benefits). Proceedings of the Second International Conference held at the State Hermitage Museum, 1–3 June 2015 (St. Petersburg 2015)*: 81–88.

Fassbinder, J.W.E., Gass, A., Hofmann, I., Belinskiy, A.B. and Parzinger H. 2015*b*. Early Iron Age kurgans from the North-Caucasus. *Archaeologia Polona [Special theme: Archaeological Prospection]* 53: 280–84.

Fedorov, A.A. and B.Ya. Rozen 1950. Krasil'nye rasteniya SSSR, in *Rastitel'noe syr'e SSSR* (Trudy BIN im. V.L. Komarova AN SSSR) 1: 349–402. Moscow and Leningrad: Soviet Academy of Sciences.

Fedorov, V.K. 1997. Ritualnaya posuda dlya otpravleniya kulta somy iz tsentralnogo Fillipovskogo kurgana, in N.A. Zakharova (ed.) *Yuvelirnoye iskusstvo i materialnaya kultura. Tezisy Dokladov IV kollokviuma v Gosudarstvennom Ermitazha*: 70–72. St. Petersburg: State Hermitage Museum.

Fedorov, V.K. and V.Ye. Gorshkova 2001. Kolchan iz chelovecheskoy kozhi v pogrebenii rannego kochevnika iz Bashkirskogo Zaural'ya, in V.K. Fedorov (ed.) *Ufimskiy arkheologicheskiy vestnik: sbornik nauchnykh statey* 3: 178–80. Ufa: National Museum of Republic of Bashkortostan.

Fedoseyev, N.F. 1999. Classification des timbres astynomiques de Sinope, in Y. Garlan (ed.) *Production et commerce des amphores anciennes en Mer Noire*: 27–48. Aix-en-Provence: Publications de l'Universite de Provence.

Fedoseyev, N.F. 2014. Zamechaniya k khronologicheskoy klassifikatsii gerakleyskikh kleym, in *Bosporskiye chteniya. Bospor, Kimmeriyskiy i Pont v period antichnosti i srednevekovya. Aktualnyye problemy arkheologii* 15: 410–18.

Ferguson, R.B. and N.L. Whitehead 2005. *War in the tribal zone: expanding states and indigenous warfare*. Santa Fe: School of American Research Press.

Fernández-Götz, M., H. Wendling and K. Winger 2014. *Paths to Complexity: Centralisation and Urbanisation in Iron Age Europe*. Oxford: Oxbow.

Fidelsky, S.A. 2012. Poselenie Chobruchi na Nizhnem Dnestre v III–II vv. do n.e., in N.P. Telnov (ed.) *Drevnosti Severnogo Prichernomor'ya III–II vv. do n.e.*: 16–20. Tiraspol': OOO 'Remont vychislitel'noj' tehniki.

Figueira, T. and C. Soares (eds) 2020. *Ethnicity and Identity in Herodotus*. Oxford: Routledge.

Finkielsztejn, G. 2001. *Chronologie détaillée et révisée des éponymes amphoriques rhodiens, de 270 à 180 av. J.-C. Premier bilan* (BAR International Series 990). Oxford: Archaeopress.

Finley, M. 1962. The Black Sea and Danubian Regions and the Slave Trade in Antiquity. *Klio* 40: 51–59.

Finsterbusch, K. 1971. *Verzeichnis und Motivindex der Han-Dastellungen. Vol. II. Abbildungen und Addenda*. Wiesbaden: Harrassowitz.

Firshteyn, B.V. 1966. Cherepa iz Aleksandropolskogo skifskogo kurgana. *Voprosy antropologii* 22: 62–76.

Fleet, J.F. (ed.) 1888. *Inscriptions of the Early Gupta Kings and their Successors* (Corpus Inscriptionum Indicarum, CII III). Calcutta: Superintendent of Government Printing.

Fleure, H.J. and H.J.E. Peake 1928. *The steppe and the sown* (The corridors of time 5). New Haven: Yale University Press.

Florea, G. 2011. *Dava et Oppidum: débuts de la genése urbaine en Europe au deuxiéme age du Fer*. Cluj-Napoca: Centrul de Studii Transilvane.

Florescu, A. and Florescu, M. 2005. *Cetățile traco-getice de la Stâncești*. Târgoviște: Cetatea de Scaun.

Florescu, A. and S. Rață 1969. Complexul de cetăți traco-getice (sec. VI–III î.e.n.) de la Stâncești – Botoșani. *Studii și Materiale Suceava*: 9–21.

Fodor, I. 1969. Skifskie i sarmatskie mechi s segmentovidnym perekrestem. *Sovetskaya arkheologiya* 1969/3: 251–54.

Fondel, C. 1962. *Dana's System of Mineralogy, Vol III: Silica Minerals*. New York and London: Wiley (seventh edition).

Frachetti, M.D. 2008. *Pastoralist Landscapes and Social Interaction in Bronze Age Eurasia*. Berkeley and London: University of California Press.

Frachetti, M.D. 2012. Multiregional emergence of mobile pastoralism and non-uniform institutional complexity across Eurasia. *Current Anthropology* 53/1: 2–38.

Francfort, H.-P. 1984. *Fouilles d'Aï Khanoum III. Le sanctuaire du temple à niches indentées 2. Les trouvailles* (Mémoires de la Délégation archéologique française en Afghanistan 27). Paris: de Boccard.

Francfort, H.-P. 1998. Central Asian Petroglyphs: between Indo-Iranian and shamanistic interpretations, in C. Chippindale and P.S.C. Taçon (eds) *The Archaeology of Rock-Art*: 302–18. Cambridge: Cambridge University Press.

Francfort, H.-P. 2001. Des cousins des Scythes?, in C. Debaine-Francfort (ed.) *Keriya, mémoires d'un fleuve: Archéologie et civilisation des oasis du Taklamakan* (Mission archéologique franco-chinoise au Xinjiang / Patrimoines d'Orient): 156–58. Paris: Éditions Findakly.

Francfort, H.-P. 2002. Images du char en Eurasie orientale des origines à la fin du 1er millénaire av. J.-C., in V.V. Bobrov (ed.) *Pervobytnaja arkheologija. Chelovek i iskusstvo. Sbornik nauchnykh trudov, posvyashchenny 70-letyu po dnya rozhdeniya Yakova Abramovicha Shera*: 80–89. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Francfort, H.-P. 2007. Choix des nomades et choix des sédentaires en Asie Centrale dans l'adaptation de thèmes et de motifs des arts de la Perse achéménide, in P. Rouillard, C. Perlès and E. Grimaud (eds) *Mobilités, immobilismes. L'emprunt et son refus*: 267–82. Paris: de Boccard.

Francfort, H.-P. 2009. La mort chez les Scythes de l'Europe à l'Altaï: la culture de Pazyryk and ses prédécesseurs à la lulière de quelques découvertes récentes, in J. Guilaine (ed.) *Sépultures and sociétés. Du Néolithique à l'Histoire. Séminaire du Collège de France*: 153–92. Paris: Errance.

Francfort, H.-P. 2011. Tillya Tépa (Afghanistan). La sépulture d'un roi anonyme de la Bactriane du 1er siècle p.C. *Topoi* 17/1: 277–347.

Francfort, H.-P. 2012. Tillya Tepe and connections with the Eurasian steppes, in J. Aruz and E. Valtz Fino (eds) *Afghanistan: Forging Civilizations along the Silk Road*: 88–101. New Haven and London: Metropolitan Museum of Art and Yale University Press.

Francfort, H.-P. 2013. *L'art oublié des lapidaires de la Bactriane aux époques achéménide et hellénistique* (Persika 1). Paris: de Boccard.

Francfort, H.-P. 2014. Les nomades installés dans la bactriane (IIe s. av. J.-c.–Ier s. ap. J.-c.): Nouvelles découvertes. *Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres* 2013/4 (November/December): 1543–76.

Francfort, H.-P. 2016. L'aigle qui marche et le cerf qui vole: images d'hybrides ornithologiques en Asie centrale ancienne, in L. de Bellefonds and A. Rouveret (eds) *L'homme-animal dans les arts visuels. Image and créatures hybrides dans le temps et dans l'espace* (Colloque Transimages): 222–69. Paris: Les Belles Lettres and Presses Universitaires de Paris Nanterre.

Francfort, H.-P. and S. Lepetz 2010. Les chevaux de Berel' (Altaï) – Chevaux steppiques et chevaux achéménides: haras et races, in A. Gardeisen, E. Furet and N. Boulbes (eds) *Histoire d'*équidés: des textes, des images et des os. *Actes du colloque organisé par l'UMR 5140 du CNRS, Montpellier, 13–14 Mars 2008* (Monographies d'Archéologie Méditerranéenne, hors série 4): 57–104. Lattes: Association pour le développement de l'archéologie en Languedoc-Rousillon.

Francfort, H.-P., A. Idriss and Zhang Yuzhong 2001. Des morts dans les sables, in C. Debaine-Francfort (ed.) *Keriya, mémoires d'un fleuve: Archéologie et civilisation des oasis du Taklamakan* (Mission archéologique franco-chinoise au Xinjiang / Patrimoines d'Orient): 137–43. Paris: Éditions Findakly.

Francfort, H.-P., G. Ligabue and Z. Samashev 1998. Découverte d'une tombe gelée d'époque scythe (IVe s. av. J.-C.) à Berel' dans l'Altaï (Kazakhstan oriental). *Compte rendus des séances de l'Académie des Inscriptions et Belles Lettres* 142/4 (December): 1165–75.

Francfort, H.-P., G. Ligabue and Z. Samashev 2000. La fouille d'un kourgane scythe gelé du IVe siècle av. notre ère à Berel' dans l'Altaï (Kazakhstan). *Compte rendus des séances de l'Académie des Inscriptions et Belles Lettres* 144/2 (June): 775–806.

Francfort, H.-P., G. Ligabue and Z. Samashev 2006. The Gold of the Griffins: Recent Excavation of a Frozen Tomb in Kazakhstan, in J. Aruz, A. Farkas, and E. Valtz Fino (eds) *The Golden Deer of Eurasia. Perspectives on the Steppe Nomads of the Ancient World* (Metropolitan Museum of Art Symposia): 114–26. New York: Metropolitan Museum of Art.

Francfort, H.-P., F. Soleilhavoup, J.-P. Bozellec, P. Vidal, F. D'errico, D. Sacchi, Z. Samashev and A. Rogozhinskij 1995. Les pétroglyphes de Tamgaly. *Bulletin of the Asia Institute* (N.S.) 9: 167–207.

Francis Jnr, P. 1980. Bead Report II: Etched Beads in Iran. *Ornament* 4/3: 24–28.

Francis Jnr, P. 1984. Bead Report X: Part II ... Etched carnelians. *Ornament* 7/3: 29, 52.

Francis Jnr, P. 1991. Beadmaking at Arikamedu and beyond. *World Archaeology* 23/1: 28–43.

Francis Jnr, P. 1999. *Beads of the World*. Atglen (PA): Schiffer (revised second edition).

Frankopan, P. 2017. Stepping out. *Apollo* (December): 100–101.

Frantz, J.H. and D. Schorsch 1990. Egyptian red gold. *Archeomaterials* 4: 133–52.

Frazer, J. 1911. *The Magic Art*. London: Grove.

Freestone, I. and C. Stapleton 2015. Composition, technology and production of coloured glasses from Roman mosaic vessels, in J. Bayley, I.C. Freestone and C. Jackson (eds) *Glass of the Roman World*: 61–76. Oxford: Oxbow.

Frye, R.N. 1946. Review of G. Vernadsky, *Ancient Russia*. *American Slavic and East European Review* 5: 212–21.

Frye, R.N. 1964. Symbols, Monograms and Devices in Ancient Iran, in *Dr. J.M. Unvala Memorial Volume*: 181–84. Bombay: Kaikhusroo M. Jamaspasa.

Frye, R.N. 1984. *The History of Ancient Iran*. Munich: C.H. Beck.

Frye, R.N. 1992. Central Asia iii. in pre-Islamic times, in E. Yarshater (ed.) *Encyclopaedia Iranica* 5: 164–69. Costa Mesa: Mazda.

Frye, R.N. 1993. *The Heritage of Persia*. Costa Mesa: Mazda (third impression, with corrections).

Frye, R.N. 1996*a*. Iranian nomadic tribes in Central Asia, in J. Herrmann and E. Zürcher (eds) *History of Humanity: from the seventh century BC to the seventh century AD,* vol. III: 443–45. Paris: UNESCO and Routledge.

Frye, R.N. 1996*b*. The fall of the Graeco-Bactrians: Śakas and Indo-Parthians, in J. Herrmann and E. Zürcher (eds) *History of Humanity: from the seventh century BC to the seventh century AD,* vol. III: 454–55. Paris: UNESCO and Routledge.

Frye, R.N. 1996*c*. The rise of the Kušān empire, in J. Herrmann and E. Zürcher (eds) *History of Humanity: from the seventh century BC to the seventh century AD,* vol. III: 456–60. Paris: UNESCO and Routledge.

Frye, R.N. 2005. *Ibn Fadlan's Journey to Russia. A Tenth-Century Traveler from Baghdad to the Volga River*. Princeton: Markus Wiener.

Frye, R.N. and B.A. Litvinsky 1996. The oasis states of Central Asia, in J. Herrmann and E. Zürcher (eds) *History of Humanity: from the seventh century BC to the seventh century AD,* vol. III: 461–64. Paris: UNESCO and Routledge.

Fukai, S. 1977. *Persian Glass*. New York / Tokyo / Kyoto: Weatherhill / Tankosha (first published as *Perushia no Garasu*, translated by E.B. Crawford).

Furasiev, A.G. and E.A. Shablavina 2019. *Kontseshti: knjazheskoe pogrebenie epohi Velikogo pereselenija narodov*. St. Petersburg: State Hermitage Museum.

Gabain, A. von 1961. Der Buddhismus in Zentralasien, in *Religion: Religionsgeschichte des Orients in der Zeit der Weltreligionen* (Handbuch der Orientalistik I.8.2): 496–514. Leiden: E.J. Brill.

Gabrielson, V. and J. Lund (eds) 2007. *The Black Sea in Antiquity: Regional and Interregional Economic Exchanges*. Aarhus: Aarhus University Press.

Gajić-Kvaščev, M., M. Marić Stojanović, Ž. Šmit, V. Kantarelou, A.G. Karydas, D. Šljivar, D. Milovanović and V. Andrić 2012. New evidence for the use of cinnabar as a colouring pigment in the Vinča culture. *Journal of Archaeological Science* 39/4: 1025–33.

Galanina, L.K. 1983. Ranneskifskiye uzdechniye nabory (po materialam Kelermesskikh kurganov). *Arkheologichesky sbornik gosudarstvennogo Ermitazha* 4: 32–55.

Galanina, L.K. 1985. Shlemy kubanskogo tipa (voprosy khronologii i proiskhozhdeniya). *Kulturnoye Naslediye Vostoka*: 169–83. Leningrad: Russian Academy of Sciences.

Galanina, L.K. 1997. *Kelermesskiye kurgany*. Moscow: Paleograph.

Galanina, L.K. and A.Yu. Alekseev 1990. Novye materialy k istorii Zakubanya v ranneskifskoye vremya. *Arkheologichesky sbornik gosudarstvennogo Ermitazha* 30: 34–54.

Gan Bowen 1972. Gansu Wuwei Leitai Dong Han mu qingli jianbao [Short account of the results of the excavation of an Eastern Han dynasty grave by the village of Leitai near the town of Wuwei in Gansu Province]. *Wenwu* 2: 16–24.

Gansu Sheng Wenwu Kaogu Yanjiusuo 2012. Gansu Qin'an Wangwa Zhanguo mudi 2009 nian fajue jianbao [Breif report on the excavation of the Warring States Wangwa cemetery in Qin'an, Gansu, in 2009]. *Wenwu* 8: 27–37.

Gansu Sheng Wenwu Kaogu Yanjiusuo 2014. *Xirong yizhen: Majiayuan Zhanguo mudi chutu wenwu* [*Treasures of the Xirong: Artifacts from the Warring States cemetery at Majiayuan*]. Beijing: Wenwu chubanshe.

Gansu Sheng Wenwu Kaogu Yanjiusuo 2017. Gansu Zhang Xian Dunping mudi 2014 nian fajue jianbao [The excavation of the Dunping cemetery in Zhangxian County, Gansu in 2014]. *Kaogu* 8: 34–51.

Gansu Sheng Wenwu Kaogu Yanjiusuo 1996. Gansu Jiuquan Xigou Cun Wei Jin mu fajue baogao [Excavation of Wei and Jin tombs at Xigou, Jiuquan, Gansu]. *Wenwu* 7: 4–38.

Gansu Sheng Wenwu Kaogu Yanjiusuo and Qingshui Xian Bowuguan 2014. *Qingshui Liuping* [Liuping, Qingshui]. Beijing: Wenwu chubanshe.

Gansu Sheng Wenwu Kaogu Yanjiusuo and Shaanxi Sheng Wenwu Kaogu Yanjiuyuan 2013. Gansu Zhangjiachuan Xian Majiayuan Zhanguo mudi

muguan shiyanshi kaogu jianbao [The laboratory archaeology of the wooden coffin of M4 in the Majiayuan cemetery of the Warring-States period in Zhangjiachuan County, Gansu]. *Kaogu* 8: 25–35.

Gansu Sheng Wenwu Kaogu Yanjiusuo and Zhangjiachuan Huizu Zizhixian Bowuguan 2008. 2006 niandu Gansu Zhangjiachuan Huizu Zizhixian Majiayuan Zhanguo mudi fajue jianbao [2006 excavation on the Majiayuan cemetery of the Warring States period in Zhangjiachuan Autonomous County of Hui Nationality, Gansu]. *Wenwu* 9: 5–28.

Gardiner-Garden, J. 1989. Ateas and Theopompus. *The Journal of Hellenic Studies* 109: 29–40.

Garkavts, A.N. (ed.) 2005. *Velikaya Step v antichnykh i vizantiyskikh istochnikakh: Sbornik materialov*. Almaty: Baur.

Garlan, Y. 1999. *Les timbres amphoriques de Thasos. I. Timbres Protothasiens et Thasiens ansiens* (Etudes Thasiennes XVIII, Corpus International des Timbres Amphoriques Fascicle 6). Paris: de Boccard.

Garlan, Y. 2004. *Les timbres ceramiques Sinopeens sur amphores et sur tuiles trouves a Sinope. Presentation et catalogue*. Paris: de Boccard.

Garlan, Y. 2004/05. En visitant et revisitant les ateliers amphoriques de Thasos. *Bulletin de Correspondance Hellénique* 128/29: 269–329.

Garner, J. 2013. *Das Zinn der Bronzezeit in Mittelasien II. Die montanarchäologischen Forschungen an den Zinnlagerstätten* (Archäologie in Iran und Turan 12 / Veröffentlichungen aus dem Deutschen Bergbau-Museum Bochum 194). Berlin / Bochum / Darmstadt: Deutsches Archäologisches Institut, Eurasien-Abteilung / Deutsches Bergbau-Museum Bochum / Philipp von Zabern.

Garrison, M. 2000. Achaemenid Iconography as Evidenced by Glyptic Art: Subject Matter, Social function, Audience and Diffusion, in C. Uehlinger (ed.) *Images as Media. sources for the cultural history of the Near East and the Eastern Mediterranean: 1st Millennium BCE* (Orbis Biblicus et Orientalis 175): 115–63. Fribourg: University Press.

Garrison, M. 2011. The Seal of 'Kuras the Anzanite, Son of Sespes' (Teispes), PFS 93*: Susa – Ansan – Persepolis, in J. Alvarez-Mon and M.B. Garrison (eds) *Elam and Persia*: 375–405. Winona Lake (IN): Eisenbrauns.

Garrison, M. and M.C. Root 2001. *Seals on the Persepolis Fortification Tablets, I: Images of Heroic Encounter* (Oriental Institute Publications 117). Chicago: The Oriental Institute, University of Chicago.

Gates, J.E. 2002. The Ethnicity Name Game: What lies behind 'Graeco-Persian'? *Ars Orientalis* 32: 105–32.

Gauglitz, E., G. Jäger and W. Jäger 1998. Bautechnische einschatzungen des Čertomlyk–kurgans aus der sight des Modernen Ingenieurs, in R. Rolle, V.Yu. Murzin and A. Alekseev (eds) *Konigskurgan Čertomlyk. Ein skythischer Grabhugel des 4. vorshristlichen Jahrhunderts* (Hamburger Forschungen zur Archäologie III): 87–92. Mainz am Rhein: Philipp von Zabern.

Gavrilov, A.V. 2004*a*. *Okruga antichnoj Feodosii*. Simferopol: ChP 'Azbuka'.

Gavrilov, A.V. 2004*b*. *Amfornye kleyma okrugi antichnoy Feodosii (materialy khronologii arkheologicheskih pamyatnikov)*. Donetsk: 'Donbass'.

Gavrilov, A.V. and I.V. Shonov 2004. Skifskie selischa V-III vv. do n.ye. v stepnoy zone centralnogo Kryma. *Drevnosti Bospora* 7: 89–99.

Gavrilov, A.K. (ed.) 2004. *Korpus bosposkih nadpisei. Albom illustratsiy (KBN-album)*. St. Petersburg: Bibliotheca Classica Petropolitana.

Gavrilova, A.A. 1965. *Mogilnik Kudyrge kak istochnik po istorii altayskikh plemen*. Moscow and Leningrad: Russian Academy of Sciences.

Gavrilyuk, A.G. and A.D. Tairov 1993. Evolyutsiya nekotorykh form savromato-sarmatskikh mechey, in V.E. Medvedev and Yu.S. Khudyakov (eds) *Voennoe delo naseleniya yuga Sibiri i Dalnego Vostoka*: 73–88. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Gavrilyuk, N.A. 1999. *Istoria ekonomiki stepnoy Skifii VI–III vv. do n.e.* Kiev: Institute of Archaeology, National Academy of Sciences of Ukraine.

Gavrilyuk, N.A. 2003. The Graeco-Scythian slave trade in the 6th and 5th centuries BC, in P. Bilde, J. Højte and V. Stolba (eds) *The Cauldron of Ariantas: Studies Presented to A.N. Shcheglov on the Occasion of his 70th Birthday*: 75–85. Aarhus: Aarhus University Press.

Gavrilyuk, N.A. 2007. Social and Economic Issues in the Development of Steppe Scythia, in D. Braund and S. Kryzhitsky (eds) *Classical Olbia and the Scythian World: From the Sixth Century BC to the Second Century AD*: 135–44. Oxford: Oxford University Press.

Gavrilyuk, N.A. 2013. *Ekonomika stepnoy Skifii VI–III vv. do n.ye.*. Kiev: 'Oleg Filjuk' (second edition).

Gavrilyuk, N.A. and M.I. Abikulova 1991. *Pozdneskifskie pamjatniki Nizhnego Podneprov'ja (Novye materialy)*. Kiev: IA NANU.

Gavrilyuk, N.A., V.P. Bylkova and S.N. Kravchenko 1992*a*. *Skifskie poselenija IV v. do n.e. v stepnom Podneprov'e*. Kiev: IA NANU.

Gavrilyuk, N.A., V.P. Bylkova and S.N. Kravchenko 1992*b*. *Skifskie poselenija IV v. do n.e. v stepnom Podneprov'e*. Kiev: IA NANU.

Gere, C. and J. Rudoe 2010. *Jewellery in the Age of Queen Victoria – a Mirror to the World*. London: British Museum Press.

Gershevitch, I. 1967. *The Avestan Hymn to Mithra with Introduction, Translation and Commentary*. Cambridge: Cambridge University Press.

Gershevitch, I. 2002. Professor Sir Harold Bailey: an appreciation, in N. Sims-Williams (ed.) *Indo-Iranian Languages and Peoples* (Proceedings of The British Academy 116): 285–96. Oxford: Oxford University Press.

Gertman, A.N. 1972. Detali konskoy uzdy v sostave Kazbekskogo klada (po materialam kollektsii GIM). *Sovetskaya Arkheologiya* 1972/3: 338–43.

Ghirshman, R. 1964. *The Art of Ancient Iran: from its origins to the time of Alexander the Great*. London: Golden Press.

Ghosh, A. 1947/48. Taxila (Sirkap), 1944–5. *Ancient India* 4: 41–84, folding plans.

Giles, E. 1910. College English: 'Sohrab and Rustum' by Matthew Arnold. *Journal of Education* 71: 326–27.

Gillard, R.D., S.M. Hardman, R.G. Thomas and D.E. Watkinson 1994. The mineralization of fibres in burial environments. *Studies in Conservation* 39: 132–40.

Ginters, W. 1928. *Das Schwert der Skythen und Sarmaten in Südrussland.* Berlin: Walter de Gruyter.

Gleba, M. 2008. You Are What You Wear: Scythian Costume as Identity, in M. Gleba, C. Munkholt and M.-L. Nosch (eds) *Dressing the Past*: 13–28. Oxford: Oxbow.

Gleba, M. 2017. Tracing textile cultures of Italy and Greece in the early first millennium BC. *Antiquity* 144: 1205–22.

Gleba, M. and T. Krupa 2012. Ukraine, in M. Gleba and U. Mannering (eds) *Textiles and Textile Production in Europe from Prehistory to AD 400*: 399–427. Oxford: Oxbow.

Glebov, V.P. 2002. Esche raz o probleme III v. do n.ye., in M.Yu. Vakhtina, V.Yu. Zuyev, E.Ya. Rogov and V.A. Khrshanovsky (eds) *Bosporskij fenomen. Pogrebalnye pamyatniki i svyatilischa*: vol. 2, 186–97. St. Peterburg: State Hermitage Museum.

Glebov, V.P. 2003. O 'sarmatskoy' konceptsii krizisa pervoy poloviny III v. do n.je. v Severnom Prichernomore, in V.N. Zinko (ed.) *Materialy IV Bosporskih chtenij. Bospor Kimmeriyskiy i varvarskij mir v period antichnosti i srednevekovya*: 80–88. Kerch.

Glebov, V.P. 2004. Khronologiya rannesarmatskoy i srednesarmatskoy kultur Nizhnego Povolzhya, in I.I. Marchenko, M.G. Moshkova and B.A. Raev (eds) *Sarmatskie kultury Evrazii: problemy regionalnoy khronologii. Doklady k 5-y mezhdunarodnoy konferentsii 'Problemy sarmatskoy arkheologii i istorii'*: 127–33. Krasnodar: OOO 'Firma NSS'.

Glebov, V.P. 2007. Specifika stanovlenija rannesarmatskoy kultury na nizhnem Donu, in I.V. Sergatskov (ed.) *Regionalnye osobennosti rannesarmatskoy kultury. Materialy seminara Centra izuchenija istorii i kultury sarmatov*: vol. II, 59–82. Volgograd: Volgograd University.

Glebov, V.P. 2009. *Rannesarmatskaya kultura nizhnego Podonya II–I vv. do n.e. Avtoreferat dissertatsii na soiskanie uchenoy stepeni kandidata istoricheskih nauk*. Moscow: IA RAN. Abstract of unpublished dissertation on competition of the scientific degree of the candidate of historical sciences.

Glebov, V.P. 2012. Kochevniki Nizhnego Podon'ja IV–II vv. do n.e. Nekotorye problemy izucheniya, in *Drevnosti Severnogo Prichernomorya III–II vv. do n.ye.*: 28–33. Tiraspol': OOO 'Remont vychislitel'noj tehniki'.

Glover, I.C. 1996. The Archaeological Evidence for Early Trade between India and Southeast Asia, in J. Reade (ed.) *The Indian Ocean in antiquity*: 365–400. London: Kegan Paul International.

Glover, I.C. and B. Bellina 2001. Alkaline Etched Beads East of India in the Late Prehistoric and Early Historic Periods. *Bulletin de l'Ecole française d'Extreme-Orient* 88: 191–215.

Glover, I.C. and B. Bellina 2003. Alkaline etched beads in Southeast Asia, in I.C. Glover, H. Hughes Brock and J. Henderson (eds) *Ornaments from the Past: Bead Studies after Beck*: 92–107. Bangkok and London: The Bead Study Trust.

Glueck, G. 1975. Scythian gold at Met brings detente. *The New York Times* 17th April: 46.

Glushkova, T.N. 2005. Tekhnologicheskaya kharakteristika *pazyrykskogo tekstilia* s plato Ukok, in N.V. Polosmak and L.L. Barkova (eds) *Kostyum i tekstil' pazyryktsev Altaya*: 170–93. Novosibirsk: Infolio Press.

Göbl, R. 1967. *Dokumente zur Geschichte der iranischen Hunnen in Baktrien und Indien*. Wiesbaden: Otto Harrassowitz (four volumes).

Göbl, R. 1971. Die sasanidische Tonbullen vom Takht-i-Suleiman und die Probleme der sasanidischen Sphragistik. *Acta Antiqua Academiae Hungaricae* 19/1–2: 95–112.

Godard, A. 1950. *Le Trésor de Ziwiyè (Kurdistan)*. Haarlem: Enschedé.

Golden, P.B. 2003. *Nomads and sedentary societies in Medieval Eurasia*. Washington D.C.: American Historical Association.

Goldman, B. 1964. Origin of the Persian Robe. *Iranica Antiqua* 4: 133–52.

Goldman, B. 1991. Women's Robes: The Achaemenid Era. *Bulletin of the Asia Institute* (N.S.) 5: 83–103.

Golieva, A.A. 2011. Drevesina v ritual'noy obryadnosti kurgannogo mogil'nika Filippovka 1, in L.T. Yablonsky (ed.) *Yestestvenno-nauchnyye metody v izuchenii Filippovskogo 1 mogil'nika*: 40–46. Moscow: Taus.

Golikov, V.P. and S.V. Ustinov 1986. Analiz krasitelei, in G.T. Kovpanenko (ed.) *Sarmatskoye pogrebeniye I v.n.e. na Yuzhnom Buge*: 140. Kiev: 'Naukova Dumka'.

Good, I. 2010. Early Islamic Textiles and their Influence on Pre-Islamic Dress, in G. Vogelsang-Eastwood (ed.) *Berg Encyclopaedia of World Dress and Fashion, 5: Central and Southwest Asia*: 282–87. Oxford: Berg.

Goodman, A. 1991. Health, adaptation, and maladaptation in past societies, in H. Bush and M. Zvelebil (eds) *Health in Past Societies: Biocultural Interpretations of Human Skeletal Remains in Archaeological Contexts* (BAR International Series 567): 31–38. Oxford: Tempus Repartum.

Goodman, A.H., J. Lallo, G.J. Armelagos and J.C. Rose 1984. Health changes at Dickson Mounds, Illinois

(AD 950–1300), in M.N. Cohen and G.J. Armelagos (eds) *Paleopathology at the Origins of Agriculture*: 271–305. London: Academic Press.

Gorbunova, N.G. 1986. The *Culture of Ancient Ferghana VI century B.C.-VI century A.D.*. (BAR International Series 281). Oxford: British Archaeological Reports.

Gordon, S. 2001. A World of Investiture, in S. Gordon (ed.) *Robes and Honor. The Medieval World of Investiture*: 1–22. New York: Palgrave Macmillan.

Gordon, S. 2010. Khil'a: Clothing to Honor a Person or Situation, in G. Vogelsang-Eastwood (ed.) *Berg Encyclopaedia of World Dress and Fashion, 5: Central and Southwest Asia*: 462–67. Oxford: Berg.

Gordon, S. (ed.) 2003. *Robes of Honour. Khil'at in Pre-Colonial India*. New Delhi: Oxford University Press.

Gorelick, L. and A.J. Gwinnett 1990. The Ancient Near Eastern cylinder seal as social emblem and status symbol. *Journal of Near Eastern Studies* 49/1: 45–56.

Gorlin, R.J., J.J. Pindborg and M.M. Cohen 1990. *Syndromes of the Head and Neck*. Oxford: Oxford University Press (third edition).

Goroncharovsky, V.A. 2003. *Mezhdu imperiey i varvarami: voennoye delo Bospora rimskogo vremeni* (Militaria Antiqua). Moscow: Philomatis.

Gotlib, A.I. 2006. Novye syuzhety tashtykskogo iskusstva (predvaritelnaya publikatsiya), in A.P. Derevyanko and V.I. Molodin (eds) *Sovremenniye problemy arkheologii Rossii: Materialy Vserossiyskogo arkheologisheskogo syezda*: vol. 2, 78–80. Novosibirsk: Institute of Archaeology and Ethnology, Siberian Branch of Russian Academy of Sciences.

Gotlib, A.I. 2007. Yarusnye zakhoroneniya tashtykskogo mogilnika Chernoozyornoye II v Khakasii, in S.P. Nesterov (ed.) *Tashtykskiye pamyatniki Khakassko-Minusinskogo kraya*: 8–38. Novosibirsk: Khakasia State University named after N.F. Katanov, Novosibirsk State University.

Grach, A.D. 1980. *Drevniye kochevniki v tsentre Aziii.* Moscow: 'Oriental Literature', Russian Academy of Sciences.

Gracheva, R.G. 2004. Cryosols of the mountains of southern Siberia and Far Eastern Russia, in J.M. Kimble (ed.) *Cryosols: Permafrost-Affected Soils*: 231–52. New York: Springer.

Graeber, D. 2001. *Toward an Anthropological Theory of Value: The False Coin of Our Own Dreams*. New York: Palgrave.

Graetsch, H., I. Topalovic and H. Gies 1994. NMR spectra of moganite and chalcedony. *European Journal of Mineralogy* 6: 459–64.

Grakov, B.N. 1928. Kurgany v okrestnostjah poselka Nezhinskogo Orenburgskogo uezda po raskopkam 1927 g. *Tsaranion* 4: 145–55.

Grakov, B.N. 1947. *Skifi*. Kiev: Academy of Sciences, Ukrainian SSR.

Grakov, B.N. 1954. *Kamenskoe gorodische na Dnepre* (Materialy i issledovaniya po arkheologii SSSR = MIA 36). Moscow: Soviet Academy of Sciences.

Gramatopol, M. 1984. Tezaurul de la Stânceşti. *Magazin Istoric* 18/11 (212): 27–28.

Gray, B. 1991. Post-Sasanian Metalwork. *Bulletin of the Asia Institute* (N.S.) 5: 59–64.

Great Britain 1943. *Naval Intelligence Handbook on Palestine and Jordan*. Oxford: Naval Intelligence Division.

Grebennikov, Yu.S. 2008. *Kimmeriytsy i skify Stepnogo Pobuzh'ya (IX–III vv. do n.e.)*. Nikolaev: Ilion.

Grechko, D.S. 2012. K voprosu o smene kultur kochevnikov na juge Vostochnoy Evropy v VI v. do n.e., in V.A. Alekshin *et al.* (eds) *Kultury stepony Evrazii i ikh vzaimodeistviye s drevnimi zivilizatsiyami*: vol. 2, 350–58. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Sciences, 'Periphery'.

Greifenhagen, A. 1970. *Schmuckarbeiten in Edelmetall.* Berlin: Gebr. Mann (two volumes).

Grenet, F. 2003. Regional interaction in Central Asia and Northwest India in the Kidarite and Hephthalite periods, in N. Sims-Williams (ed.) *Indo-Iranian languages and peoples* (Proceedings of the British Academy 116): 203–24. London: The British Academy.

Grenet, F. 2010. A view from Samarkand: the Chionite and Kidarite periods in the archaeology of Sogdiana (fourth to fifth centuries A.D.), in M. Alram *et al.* (eds) *Coins, Art and Chronology II*: 267–81. Vienna: Austrian Academy of Sciences.

Griffin, R.C. and D. Donlon 2009. Patterns in dental enamel hypoplasia by sex and age at death in two archaeological populations. *Archives of Oral Biology* 54S: 93–100.

Griffith, T.H.R. 1895. *The Hymns of the Atharva-Veda Translated with a Popular Commentary*. 1. Benares: E.J. Lazarus and Co.

Grinin, L.E. 2006. *Rannee gosudarstvo, ego alternativy i analogy*: 85–163. Volgograd: Uchitel.

Grinin, L.E. and A.V. Korotaev 2013. Epokha pervichnogo politogeneza, in V.A. Popov (ed.) *Ranniye formy potestarnykh system*: 31–64. St. Petersburg: Museum of Anthropology and Ethnography, Russian Academy of Sciences.

Gromov, A.V. 1997. Proiskhozhdeniye i svyazi okunevskogo naseleniya Minusinskoy kotloviny, in D.G. Savinov and M.L. Podolsky (eds) *Okunevsky Sbornik. Kultura. Iskusstvo. Antropologiya*: 301–45. St. Petersburg: Petro Rif.

Grossheim, A.A. 1946. *Rastitel'nye resursy Kavkaza*. Baku: Azerbaijan SSR Academy of Sciences.

Grueber, H.A. 1910. *Coins of the Roman Republic in the British Museum. Vol. 2. Coinages of Rome, Roman Campania, Italy, the social war and the provinces.* London: Longmans.

Grunskaya-Petrova, I.P. 1939. *Krasil'nye rasteniya yuzhnoy chasti Nagorno-Karabakhskoy avtonomnoy oblasti i opyt*

sbora narodnykh svedeniy po nim 6: 526–608. Baku: Azerbaijan SSR Academy of Sciences.

Gryaznov, M.P. 1950. *Pervyj Pazyrykskij Kurgan*. Leningrad: State Hermitage Museum.

Gryaznov, M.P. 1969. *The Ancient Civilization of South Siberia*. London: Barrie and Rockliff and The Cresset Press.

Gryaznov, M.P. 1980. *Arzhan. Tsarsky kurgan ranneskifskogo vremeni*. Leningrad: Russian Academy of Sciences.

Gryaznov, M.P. 1984. *Der Grosskurgan von Arzan in Tuva, Südsibirien* (Materialen zur Allgemeinen und Vergleichenden Archäologie 2). Munich: C.H. Beck.

Gryaznov, M.P., M.P. Zavitukhina, M.N. Komarova, S.S. Minyayeva, M.N. Pshenitsina and Yu.S. Khudyakov 1979. *Kompleks arkheologicheskikh pamyatikov u gory Tepsei na Yenisei*. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Gulyaev, V.I. 2004. Eshche raz k voprosu ob etnokulturnoy situatsii v Srednem Podonye v skifskoe vremya (V–IV vv. do n.e.), in V.I. Gulyaev (ed.) *Arkheologiya Srednego Dona v skifskuyu epokhu*: 7–24. Moscow: Institute of Archaeology, Russian Academy of Sciences.

Gulyaev, V.I. 2009. 'Paradnye' mechi V–IV vv. do n.e. iz kurganov Skifii, in V.V. Kileynikov (ed.) *Arkheologicheskie pamyatniki Vostochnoy Evropy* 13: 147–51. Voronezh.

Gutsalov, S.Yu. 2004. *Drevnie kochevniki Yuzhnogo Priuralya VII–I vv. do n.e.* Ural'sk: 'Poligrafservis'.

Gutsalov, S.Yu. 2007. Pogrebalnyye pamyatniki kochevoy elity Yuzhnogo Priural'ya serediny 1 tys. do n.e. *Arkheologiya, Etnografiya i Antropologiya Evrazii* 30 (2007/2): 75–92.

Gutsalov, S.Yu. 2012. On links between the Ancient Nomads in the Southern Foothills of the Urals and Central Asia. *Ancient Civilizations from Scythia to Siberia* 18/1: 29–50.

Habsburg-Lothringen, G. von and M. Lopato 1993. *Fabergé Imperial Jeweller*. St. Petersburg and Washington D.C.: Thames and Hudson on behalf of the State Hermitage Museum and the Fabergé Arts Foundation.

Hackin, J. 1939. *Recherches Archéologiques à Begram. Chantier N° 2 (1937)* (Mémoires de la Délégation Archéologique Française en Afghanistan IX). Paris: Les Éditions d'Art et d'Histoire.

Haerinck, E. 1989. The Achaemenid (Iron Age IV) period in Gilan, Iran, in L. de Meyer and E. Haerinck (eds) *Archaeologia Iranica et Orientalis. Miscellanea in honorem Louis Vanden Berghe*: 455–74. Gent: Peeters.

Haheu, V. 2008. *Sisteme de fortificații de la est de Carpați*. Chișinău: Academy of Sciences of Moldova, Institute of Cultural Patrimony, Centre of Archaeology.

Haimovici, S. 1983. Caractéristiques des chévaux des gétes decouvértes dans la necropole de Zimnicea. *Dacia* (N.S.) 27: 79–107.

Haimovici, S. 1992. Observații cu privire la motivul animalier în toreutica traco-geto-dacă. *Thraco-Dacica* 13: 179–93.

Haimovici, S. and C. Tarcan-Hrișcu 1996. Unele particularități morfologice ale unui craniu de cal descoperit în cetatea geto-dacică de la Butuceni (Republica Moldova). *Arkheologia Moldovei* 19: 306–10.

Haines, B.M. 2006. The fibre structure of leather, in M. Kite and R. Thomson (eds) *Conservation of leather and related materials*: 11–21. Oxford: Butterworth-Heinemann.

Hakemi, A. 1997. *Shahdad: Archaeological excavations of a Bronze Age center in Iran*. Rome: IsMEO.

Hall, C. 1994. *Gemstones*. London / New York / Sydney / Moscow: Dorling Kindersley.

Hall, E.T. 1961. Surface enrichment of buried metals. *Archaeometry* 4: 62–66.

Hallas, C.S. 2004. Metcalf, John [so-called Blind Jack of Knaresborough] (1717–1810), road builder and surveyor. *Oxford Dictionary of National Biography* (online edition). *Oxford University Press*. doi:10.1093/ref:odnb/9780198614128.001.0001/odnb-9780198614128-e-18616. [Last accessed November 2018].

Hambly, G.R.G. 2005. Central Asia: history, in *The New Encyclopaedia Britannica* 15: 705–707. Chicago: Encyclopaedia Britannica (fifteenth edition).

Hanks, B. 2010. Archaeology of the Eurasian Steppes and Mongolia. *Annual Review of Anthropology* 39: 469–86.

Hanks, B. *et al.* 2000. Iron Age Nomadic Burials of the Eurasian Steppes: A Discussion Exploring Burial Ritual Complexity, in J. Davis-Kimball and E.M. Murphy (eds) *Kurgans, Ritual Sites and Settlements: Eurasian Bronze and Iron Age* (BAR International Series 890): 19–30. Oxford: Archaeopress.

Hannestad, L. 2007. Timber as a Trade Resource of the Black Sea, in V. Gabrielson and J. Lund (eds) *The Black Sea in Antiquity: Regional and Interregional Economic Exchanges*: 85–100. Aarhus: Aarhus University Press.

Hansen, V. 2017. *The Silk Road: a New History with Documents*. New York: Oxford University Press.

Hartmann, A. 1978. Ergebnisse der spektralanalytischen Untersuchung vor und frühgeschichtlicher Goldfunde aus rumänischen Boden. *Germania* 67: 5–10.

Hartog, F. 1988. *The Mirror of Herodotus. The Representation of the Other in the Writing of History*. Berkeley, Los Angeles and London: University of California Press.

Harțuche, N. 1985. Mormântul princiar traco-getic de la Gălvani, județul Brăila. *Istros* 4: 13–24.

Hauptman, H. 1983. Neue Funde eurasischer Steppennomaden in Kleinasien, in R.M. Boehmer and H. Hauptmann (eds) *Beiträge zur Altertumskunde Kleinasiens: Festschrift für Kurt Bittel*: 251–70. Mainz am Rhein: Philipp von Zabern.

Hawkins, G.S. and J.B. White 1965. *Stonehenge decoded*. Garden City (NY).

Hawkins, S. 2013. Greek and the Languages of Asia Minor to the Classical Period, in E.J. Bakker (ed.) *A Companion to the Ancient Greek Language*: 213–27. Oxford: Oxford University Press.

Hayward, M. 2007. *Dress at the Court of King Henry VIII*. London: Routledge.

Heather, P. 2008. Die Wanderung der Goten: Von Skandinavien nach Thrakien, in J. Frings (ed.) *Rom und die Barbaren. Europa zur Zeit der Völkerwanderung (Ausstellung)*: 160–63. München: Hirmer.

Heather, P. and J. Matthews 1991. *Goths in the Fourth Century*. Liverpool: Liverpool University Press.

Heintze, H.F. von, Th. Kraus and H. Sichtermann 1967. *Römische Relief Kunst in Propyläen Kunstgeschichte*. Berlin.

Hellwig, O. 2009. *Wörterbuch der mittelalterlichen indischen Alchemie* (eJIM 2, supplement). Groningen: Barkhuis and University of Groningen.

Heltzer, M. 1994. Mordekhai and Demaratos and the Question of Historicity. *Archaeologische Mitteilungen aus Iran* 27: 119–21.

Henderson, J., J. An and H. Ma 2018. The Archaeometry and Archaeology of Ancient Chinese Glass: A Review. *Archaeometry* 60/1: 88–104.

Henkelman, W. 1996. The royal Achaemenid crown. *Archäologische Mitteilungen aus Iran* 28: 275–93, pls 16.2–19.6.

Henkelman, W. 2003. Persians, Medes and Elamites: Acculturation in the Neo-Elamite Period', in G. Lanfranchi, M. Roaf and R. Rollinger (eds) *Continuity of Empire (?) Assyria, Media, Persia*: 180–231. Padova: S.a.r.g.o.n Editrice e libreria.

Henkelman, W.F.M. and M.W. Stolper 2009. Ethnic identity and ethnic labelling at Persepolis: the case of the Skudrians, in P. Briant and M. Chauveau (eds) *Organisation des pouvoirs et contacts culturels dans les pays de l'empire achéménide* (Actes du colloque organisé au Collège de France par la « Chaire d'histoire et civilisation du monde achéménide et de l'empire d'Alexandre » et le « Réseau international d'études et de recherches achéménides » (GDR 2538 CNRS), 9–10 novembre 2007): 271–329. Paris: De Boccard.

Herrmann, G. 1989. Parthian and Sasanian Saddlery. New Light from the Roman West, in L. de Meyer and E. Haerinck (eds) *Archaeologia Iranica et Orientalis*. Miscellanea in Honorem Louis Vanden Berghe: 757-809. Gent: Peeters.

Herrmann, G. 2017. *Ancient Ivory. Masterpieces of the Assyrian Empire*. London: Thames and Hudson.

Herzfeld, E. 1935. *Archaeological History of Iran* (Schweich Lectures on Biblical Archaeology 1934). London: Oxford University Press.

Heussner, K.-U. and I.Yu. Slyusarenko 2007. Die Dendrochronologie von Arzhan 2, in W. Menghin and H. Parzinger (eds) *Im Zeichen des Goldenen Greifen. Königs Gräber der Skythen*: 82–83. Munich / Berlin / London / New York: Prestel.

Hiebert, F.T. and P. Cambon (eds) 2011. *Afghanistan. Crossroads of the Ancient World*. London: British Museum Press.

Hickman, J. 2012. Bactrian Gold: Jewelry Workshop Traditions at Tillya Tepe, in J. Aruz and E. Valtz Fino (eds) *Afghanistan. Forging Civilizations along the Silk Road:* 78–87. New York: The Metropolitan Museum of Art.

Higgins, R. 1974. *Minoan and Mycenaean Art*. London: Thames and Hudson.

Higham, C.F.W. 2004. Ay Khanum, Hotan, Kaxgar (Kashgar), Kharoshthi, Kushans, Lou-lan, Niya, Sakas, Shan-shan, Tarim Basin, Tillya Tepe, Xiongnu, in *Encyclopaedia of Ancient Asian Civilizations*: 29–30, 143, 179–80, 182, 189–91, 205–27, 242–44, 291, 309–11, 339–42, 349–51, 390–92. New York: Facts on File, Inc.

Hildinger, E. 2001. Scythians and Sarmatians, in E. Hildinger (ed.) *Warriors of the Steppe: a Military History of Central Asia, 500 B.C. to 1700 A.D.*: 33–55. Staplehurst (Kent): Spellmount.

Hinüber, O. von 2011. Four Donations Made by Maṅgalahaṃsikā, Queen of Palola (Gilgit). *Annual Report of the International Research Institute for Advanced Buddhology at Soka University for the Academic Year 2010*, 14: 3–6.

Hinz, W. and H. Koch 1987. *Elamisches Wörterbuck, Vols I–II* (Archäologische Mitteilungen aus Iran Ergänzungsband 17). Berlin: Dietrich Reimer.

Hirth, K. 1978. Interregional Trade and the Formation of Prehistoric Gateway Communities. *American Antiquity* 43/1: 35–45.

Hoffmann, H. 1966. *Tarentine rhyta*. Mainz am Rhein: Philipp von Zabern.

Hole, F. 1979. Rediscovering the Past in the Present: Ethnoarchaeology in Luristan, Iran, in C. Kramer (ed.) *Ethnoarchaeology. Implications of Ethnography for Archaeologists*: 129–218. New York: Columbia.

Höllmann, T.O., G. Kossack and K. Jettmar (eds) 1992. *Maoqinggou: ein eisenzeitliches Gräberfeld in der Ordos-Region (Innere Mongolei).* Mainz: Philip von Zabern.

Holt, F.L. 2005. *Into the Land of Bones: Alexander the Great in Afghanistan*. Berkeley: University of California Press.

Honeychurch, W. 2010. Pastoral nomadic voices. A Mongolian archaeology for the future. *World Archaeology* 42/3: 405–17.

Honeychurch, W. 2013. The Nomad as State Builder: Historical Theory and Material Evidence from Mongolia. *Journal of World Prehistory* 26/4: 283–321.

Honeychurch, W. 2014. Alternative Complexities. The Archaeology of Pastoral Nomadic States. *Journal of Archaeological Research* 22/4: 277–326.

Honeychurch, W. 2015. *Inner Asia and the Spatial Politics of Empire. Archaeology, Mobility, and Culture Contact*. New York: Springer.

Honeychurch, W. and C.A. Makarewicz. 2016. The Archaeology of Pastoral Nomadism. *Annual Review of Anthropology* 45: 341–59.

Horedt, K. and D. Protase 1972. Das Zweite Fürstengrab von Apahida (Siebenbürgen). *Germania* 50/1–2: 174–220.

Hoskins, H.D. and M.A. Kass 1969. *Becker-Shaffer's Diagnosis and Therapy of the Glaucomas*. Baltimore: The C.V. Mosby Company (sixth edition).

Hua Tao 2008. Satuq Bughra Khan and the beginning of Islamization in the Tian Shan region, in Jin Yijiu (ed) *Dangdai Zhongguo zongjiao yanjiu jingxuan congshu. Yisilanjiao jun* [Chinese religions and beliefs. A series of contemporary studies in China. Islam]: 116-34. Beijing: Minzu chubanshe.

Huang Xiaojun, Wei Qing, Zhao Xichen and Yang Jing 2016. Gansu Majiayuan Zhanguo mudi M4 chutu shenti zhuangshijian de baohu xiufu ji fuyuan yanjiu [Conservation and restoration of body ornaments excavated from Warrring States period tomb M4 at Majiayuan]. *Zhongguo guojia bowuguan guankan* 6: 148–56.

Hudson, M. 2017. Thrilling gallop back in time. *The Daily Telegraph* 13th September: 25.

Hughes, J. 2011. Ancient Deforestation Revisited. *Journal of the History of Biology* 44/1: 43–57.

Hughes, J. and J. Thirgood 1982. Deforestation, Erosion, and Forest Management in Ancient Greece and Rome. *Journal of Forest History* 26/2: 60–75.

Hunt Ortiz M.A., S. Consuegra Rodríguez, P. Díaz Del Río Español, V. Hurtado-Pérez and I. Montero-Ruiz 2011. Neolithic and Chalcolithic – VI to III millennia BC – use of cinnabar (HgS) in the Iberian Peninsula: analytical identification and lead isotope data for an early mineral exploitation of the Almadén (Ciudad Real, Spain) mining district, in J.E. Ortiz, O. Puche, I. Rábano and L.F. Mazadiego (eds) *History of Research in Mineral Resources. Cuadernos del Museo Geominero* 13: 3–14. Madrid: Instituto Geológico y Minero de España.

Hussein, M., M. Altaweel and McG. Gibson 2016. *Nimrud. The Queens' Tombs*. Baghdad and Chicago: Iraq State Board of Antiquities and Heritage and The Oriental Institute of the University of Chicago.

Hyland, A. 1990. *Equus. The Horse in the Roman World.* London: B.T. Batsford.

ICOM 2006. *Red List of Afghanistan Antiquities at Risk*. Paris: UNESCO.

Ilinskaya, B.A. 1968. *Skify dneprovskogo lesostepnogo Levoberezh'ya (kurgany Posul'ya)*. Kiev: 'Naukova Dumka'.

Ilinskaya, V.A. and A.I. Terenozhkin 1983. *Skifia VII–IV vv. do n.e*. Kiev: 'Naukova Dumka'.

Imperial Archaeological Commission 1907. *Otchyot Imperatorskoy Arkheologicheskoy komissii za 1904*. St. Petersburg: Imperial Archaeological Commission.

Indian Archaeology – A Review [IAR]. New Delhi: Archaeological Survey of India.

Inizan, M.-L. 1995. Cornaline et agates: Production et circulation de la préhistore à nos jours, in F. Tallon (ed.) *Les pierres précieuses de l'Orient ancien des Sumériens aux Sassanides*: 21–24. Paris: Éditions du Éditions de la Réunion des musées nationaux.

Inizan, M.-L. 1999. La cornaline de l'Indus et la voie du Golfe au IIIème millénaire, in A. Caubet (ed.) *Cornaline et Pierres Précieuses. La Méditerranée, de l'Antiquité à l'Islam*: 125–38. Paris: Musée du Louvre and La documentation française.

Inizan, M.-L. 2000. Importation de cornalines et d'agates de l'Indus en Mésopotamie, le cas de Suse et Tello, in V. Roux (ed.) *Cornaline de l'Inde, Des pratiques techniques de Cambay aux technosystèmes de l'Indus*: 475–501. Paris: Éditions de la Maison des sciences de l'homme.

Inizan, M.-L., M. Jazim and F. Mermier 1992. L'artisanat de la cornaline au Yémen: premières données. *Techniques et cultures* 20: 155–74.

Ippel, A. 1922. *Der Bronzefund von Galjûb. Modelle eines Hellenistischen Goldschmieds*. Berlin: Karl Curtius.

Irimia, M. 2005. Cu privire la raporturile dintre sciți, geți și coloniile grecești la Dunărea de Jos în secolele VI–IV a.Chr.. *Revista română de studii eurasiatice* 1: 51–93.

Irons, W. 1979. Political Stratification among Pastoral Nomads, in L'Equipe écologie et anthropologie des sociétés pastorales (ed.) *Pastoral production and society = Production pastorale et société : proceedings of the international meeting on nomadic pastoralism / Actes du colloque international sur le pastoralisme nomade, Paris 1-3 Décembre 1976*: 361–74. Cambridge: Cambridge University Press.

Ismagylov, R.B. 1978. Kinzhaly pozdnesavromatskogo vremeni iz Bashkirii. *Sovetskaya Arkheologiya* 1978/4: 229–38.

Ismagylov, R.B. 1980. Priural'skie akinaki s navershiem v vide ushastogo grifona i khishchnogo zhivotnogo. *Sovetskaya Arkheologiya* 1980/1: 219–28.

Istvan, F. (ed.) 2013. *Ancient burial masks. Hungarian burial tradition of eastern origin*. Budapest: Hungarian National Museum.

Istvánovits, E. and V. Kulcsár 2017. *Sarmatians: History and Archaeology of a Forgotten People* (Forschungs Institut für Vor- und Frühgeschichte Monographien 123). Mainz am Rhein: Römisch-Germanischen Zentralmuseums.

Itina, M.A. 1977. *Istoriya stepnykh plemen yuzhnogo Priaral'ya (II nachalo I tysyacheletiya do n.e.)* (Trudy Khorezmskoy Arkheologo-Etnograficheskoy Ekspeditsii 10). Moscow: Russian Academy of Sciences.

Ivanov A.A., V.G. Lukonin and L.S. Smesova 1984. *Iuvelirnyie izdeliya vostoka: drevnyi and srednevekovyi periody*. Moscow: 'Artiya'.

Ivanchik, A.I. 2005*a*. Who were the the 'Scythian' archers on archaic Attic vases?, in D. Braund (ed.) *Scythians and Greeks. Cultural Interactions in Scythia, Athens and the Early Roman Empire (Sixth Century BC–First Century AD)*: 100–13. Exeter: University of Exeter Press.

Ivanchik, A.I. 2005*b*. *Severnoe Prichernomorie i Stepnye Kochevniki 8–7 vv. do n.e. v Antichnoy Literaturnoy Tradicii: Folklor, Literatura i Istoriya*. Moscow and Berlin: Paleograf.

Ivanchik, A.I. 2006. 'Scythian' archers on Archaic Attic vases: problems of interpretation. *Ancient Civilizations from Scythia to Siberia* 12: 197–271.

Ivanchik, A.I. 2018. Scythians, ii. history, in E. Yarshater (ed.) *Encyclopaedia Iranica*, accessed 25th April 2018, <http://www.iranicaonline.org/articles/scythians#History>

Ivashchenko, M.V. 2012. Amfornye klejma iz poselenija Chobruchi na levoberezhe Nizhnego Dnestra, in N.P. Telnov (ed.) *Drevnosti Severnogo Prichernomorya III–II vv. do n.e.*: 81–86. Tiraspol': OOO 'Remont vychislitel'noj tehniki' Publishers.

Izvlecheniye 1855. *Izvlecheniye iz Vsepoddanneyshego otcheta ob arkheologicheskikh razyskaniyakh v 1853 godu*. St. Petersburg: Printing house of the Imperial Academy of Sciences.

Jacobs, B. 2014. Bildkunst als Zeugnis für Orientierung und Konsens innerhalb der Eliten des westlichen Achämenidenreichs, in R. Rollinger and K. Schnegg (eds) *Kulturkontakte in antiken Welten. Vom Denkmodell zum Fallbeispiel. Proceedings des internationalen Kolloquiums aus Anlass des 60. Geburtstags von Christoph Ulf. Innsbruck 26. bis 30. Januar 2009* (Colloquia Antica 10): 343–68. Leuven: Peeters.

Jacobson, E. 1985. Mountains and Nomads: A Reconsideration of the Origins of Chinese Landscape Representation. *Bulletin of the Museum of Far Eastern Antiquities (Östasiatiska Museet), Stockholm* 57: 133–79.

Jacobson, E. 1988. Beyond the Frontier. A Reconsideration of Cultural Interchange Between China and the Early Nomads. *Early China* 13: 201–40.

Jacobson, E. 2005. *The Art of the Scythians. The Interpenetration of Cultures at the Edge of the Hellenic World*. Leiden: E.J. Brill.

Jakes, K.A. and J.H. Howard 1986. Replacement of protein and cellulose fibers by copper minerals and the formation of textile pseudomorphs, in H.L. Needles and S. Haig Zeronian (eds) *Historic Textile and Paper Materials: Conservation and Characterization*: 277–87. Washington, DC: American Chemical Association.

Jakes, K.A. and L.R. Sibley 1984. An Examination of the Phenomenon of Textile Fabric Pseudomorphism, in J.B. Lambert (ed.) *Archaeological Chemistry III*: 403–24. Washington D.C.: American Chemical Society.

James, M.A., N. Reifarth, A.J. Mukherjee, M.P. Crump, P.J. Gates, P. Sandor, F. Robertson, P. Pfälzner and R.P. Evershed 2009. High prestige Royal Purple dyed textiles from the Bronze Age royal tomb at Qatna, Syria. *Antiquity* 83/322: 1109–18.

Janaway, R.C. 1987. The preservation of organic materials in association with metal artifacts deposited in inhumation graves, in A. Boddington, A.N. Garland and R.C. Janaway (eds) *Death, Decay and Reconstruction. Approaches to Archaeology and Forensic Science*: 127–48. Manchester: Manchester University Press.

Januszczak, W. 2017. Shining example. *The Sunday Times Culture Magazine* (24th September): 12.

Jasim, S.A. 2006. Trade centres and commercial routes in the Arabian Gulf: Post-Hellenistic discoveries at Dibba, Sharjah, United Arab Emirates. *Arabian Archaeology and Epigraphy* 17/2 (November): 214–37.

Jaspers, K. 1949. Die Achsenzeit der Weltgeschichte. *Der Monat* 2/6: 3–9.

Javadi, H. 2003. Mātīū Ārnūld va tarjumeh-yi dāstān-i <<Rustam va Suhrāb>>. *Iran nameh* 21: 301–12.

Jayakumar, P. 2001. Carnelian beads from the Kodumanal megaliths, in S. Rajagopal (ed.) *Kaveri: Studies in Epigraphy, Archaeology and History (Professor Y. Subbarayalu Felicitation Volume)*: 248–55. Chennai: Panpattu Veliyiittakam.

Jettmar, K. 1951. *The Altai Before the Turks* (The Museum of Far Eastern Antiquities Bulletin 23). Stockholm: The Museum of Far Eastern Antiquities.

Jettmar, K. 1965. *L'art des steppes. Le style animalier eurasiatique genèse et arrière-plan social* (L'art dans le monde). Paris: Albin Michel.

Jettmar, K. 1967. *Art of the Steppes: the Eurasian Animal Style*. London: Methuen.

Jin, Junli 2009. Chronological and Cultural Framework of Bronzes in Northern China during the 4th to the 3rd Millennia B.P. Unpublished PhD dissertation, University of Tübingen.

Johnson, J.A. 2014. Community Matters? Investigating Social Complexity through Centralization and Differentiation in Bronze Age Pastoral Societies of the Southern Urals, Russian Federation, 2100–900 BC. Unpublished PhD dissertation, Department of Anthropology, University of Pittsburgh.

Johnson, J.A. 2018. Presenting the Warrior? Iron Age Scythian Materials and Gender Identity at the British Museum. *American Journal of Archaeology* 122/3: 1–10 [https://doi.org/ajaonline1223.Johnson].

Johnson, J., S. Makhortykh, A. Ventresca Miller, and T. Taylor forthcoming. Tales of Two Cities: Demographic Centralization, Land Use, and Trade in the Pontic Forest-Steppe Urban Developments, ca. 700–200 BC. *Journal of World Prehistory*.

Jones, J. 2017. Wine-drinking, weed-smoking warriors storm the British Museum in a beguiling show that's part of game of thrones. *The Guardian* 13th September: 34.

Jordana, X., I. Galtés, T. Turbat, D. Batsukh, C. García, A. Isidro, P.-H. Giscard and A. Malgosa 2009. The warriors of the steppes: osteological evidence of warfare and violence from Pazyryk tumuli in the Mongolian Altai. *Journal of Archaeological Science* 36: 1319–27.

Joshi, J.P. 1972. Exploration in Northern Kutch and Excavation at Surkotada. *Journal of the Oriental Institute, Baroda* 22: 98–144.

Juliano, A. 1991. The Warring States Period – The State of Qin, Yan, Chu, and Pazyryk: a Historical Footnote. *Source: Notes in the History of Art* 10/4: 25–29.

Jung Suk-Bae 1998*a*. Problema vzaimootnosheniy plemen Severnogo Kitaya s plemenami Yuzhnoy Sibiri v epokhu bronzy i rannego zheleza (na osnove sravnitel'nogo izucheniya kinzhalov i nozhey). Unpublished PhD dissertation, University of Moscow.

Jung Suk-Bae 1998*b*. Kinzhaly epokhi rannego zheleza iz Severnogo Kitaya, in B.A. Raev (ed.) *Antichnaya tsivilizatsiya i varvarskiy mir (Materialy 6-go arkheologicheskogo seminara) Part 1*: 23–29. Krasnodar: Krasnodar State Academy of Culture.

Junge, J. 1939. Die ost-saka, in J. Junge (ed.) *Saka-Studien: der ferne nordosten im Weltbild der Antike* (Klio 41/28): 83–105. Leipzig: Scientia.

Junkelmann, M. 1992. *Die Reiter Roms. Vol. III: Zubehör, Reitweise, Bewaffnung* (Kulturgeschichte der Antiken Welt 53). Mainz am Rhein: Philipp von Zabern.

Kachalova, N.K. 1983. O lokalnykh razlichiyakh Poltavkinskoy kulturno-istoricheskoy obshchnosti. *Arkheologicheskiy Sbornik* 24: 4–19.

Kadlečíková M., J. Breza, L. Vančo, M. Gregor and I. Bazovský 2015. Raman Spectroscopy of Ancient Beads from Devín Castle near Bratislava and of Four Intaglios from other Archaeological Finds in Slovakia. *The Journal of Gemmology* 34/6: 510–17.

Kadyrbayev, M.K. 1966. Pamyatniki tasmolinskoj kultury, in A.Kh. Margulan, K.A. Akishev, M.K. Kadyrbayev and A.M. Orazbayev (eds) *Drevnyaya kultura Centralnogo Kazakhstana*: 303–433. Alma-Ata: Kazakh SSR Academy of Sciences.

Kadyrbayev, M.K. 1984. Kurgannyye nekropoli verkhovyyev r. Ilek, in A.I. Melyukova, M.G. Moshkova and V.G. Petrenko (eds) *Drevnosti Evrazii v skifo-sarmatskoye vremya*: 84–93. Moscow: Russian Academy of Sciences.

Kadyrbayev, M.K. and J. Kurmankulov 1976. Zahoroneniiya voinov savromatskogo vremeni na levoberejie r. Ilek, in K.A. Akishev (ed.) *Proshloe Kazkstana po arkheologitcheskim istotchnikam*: 137–56. Alma-Ata: Kazakh SSR Academy of Sciences.

Kakoulli, I. 2009. *Greek Painting Techniques and Materials from the Fourth to the First Century BC*. London: Archetype.

Kaltsas, N.E. and J. Giannakopoulou 2007. *The National Archaeological Museum*. Athens: EFG Eurobank Ergasias S.A. and John S. Latsis Public Benefit Foundation.

Kamaleev, Z.V. 2018. Otchet i khraneniiye kollektsii Filippovsikh kurganov v Muzei arkheologii i ethnografii, in R.D. Ghilyazetdinov (ed.) *Kollektsii Filippovka kurganov iz fondor Muzei arkheologii i ethnografii*: 70–391. Ufa: Kital.

Kambakhsh-e Fard, S.O. 1998. *Parthian Pithos-Burials at Germi (Azarbaijan)* (Iranian Journal of Archaeology and History Supplement 1). Tehran: Iran University Press.

Kaniuth, K. 2006. *Metallobjekte der Bronzezeit aus Nordbaktrien* (Archäologie in Iran und Turan 6). Mainz am Rhein: Philipp von Zabern.

Kantorovich, A.R. 2010. Istoki i variatsii obrazov grifona i grifonopodobnykh sushchestv v ranneskifskom zverinom stile VII–VI vv. do n.e. *Arkheologicheskiy almanakh* 12: 189–224.

Kantorovich, A.R. 2015. Skifskiy zverinyy stil' Vostochnoy Evropy. Klassifikatsiya, tipologiya, khronologiya, evolyutsiya. Unpublished PhD dissertation, Moscow State University.

Kaptan, D. 2002. *The Daskyleion Bullae. Seal Images from the Western Achaemenid Empire* (Achaemenid History 12). Leiden: Nederlands Instituut voor het Nabije Oosten.

Karanth, R.V. 1988. Silica bead industry in Cambay, Gujarat State, India. *Journal of the Geological Society of India* 31 (April): 426–31.

Karanth, R.V. 1992. The Ancient Gem Industry in Cambay. *Man and Environment* 17/1: 61–70.

Karo, G. 1930. *Die Schachtgräber von Mykenai. Tafeln*. München: Verlag F. Bruckmann AG.

Kats, V.I. 1994. *Keramicheskie klejma Hersonesa Tavricheskogo. Katalog-opredelitel'*. Saratov: University Publishing House.

Kats, V.I. 2007. *Grecheskiye keramicheskiye kleyma epokhi klassiki i ellinizma (opyt kompleksnogo izucheniya)* (Bosporskiye issledovaniya 18). Simferopol and Kerch: Crimean Branch of the Institute of Oriental Studies.

Kats, V.I. 2015. *Keramicheskiye kleyma Aziatskogo Bospora. Gorgippiya i eye khora. Semibratneye gorodishche. Katalog*. Saratov: University Publishing House.

Kats, V.I. 2016. Izyskaniya S.V. Polina v oblasti keramicheskoy epigrafiki Geraklei Pontiyskoy. *Stratum plus* 2016/3: 241–58.

Kawami, T.S. 1991. Greek Art and the Finds at Pazyryk. *Source: Notes in the History of Art* 10/4: 16–19.

Kayama, M., N. Tomioka, E. Ohtani, Y. Seto, H. Nagaoka, J. Götze, A. Miyake, S. Ozawa, T. Sekine, M. Miyahara, K. Tomeoka, M. Matsumoto, N. Shoda, N. Hirao and T. Kobayashi 2018. Discovery of moganite in a lunar meteorite as a trace of H2O ice in the Moon's regolith. *Science Advances* 4/5: eaar4378.

Kazakhstan 2002. *Natsionalnaiya entciklopediya* (Kazakzskaiya entsiklopediya 4). Almaty.

Keenleyside, A. 2008. Dental pathology and diet at Apollonia, a Greek colony on the Black Sea. *International Journal of Osteoarchaeology* 18: 262–79.

Keenleyside, A., H. Schwarcz and K. Panayotova 2006. Stable isotopic evidence of diet in a Greek colonial population from the Black Sea. *Journal of Archaeological Science* 33: 1205–15.

Keller, D. 2001. Fabulous Creatures from the Desert Sands, in D. Keller and R. Schorta (eds) *Fabulous Creatures from the Desert Sands. Central Asian Woolen*

Textiles from the Second Century BC to the Second Century AD (Riggisberger Berichte 10): 9–13. Riggisberg: Abegg-Stiftung.

Kelly, G.I.O. 2013. Craft specialization, techology and social change: a study of material culture in Iron Age and Early Historic South India (*c.* 1200 BCE–400 CE). Unpublished PhD dissertation, University of Wisconsin – Madison.

Kelly, G.I.O. 2017. The Megalithic Bleached Carnelian Beads of the Deccan: Chronology and Use as a Medium of Exchange, in M.N. Bari and H.M. Maheshwarajah (eds) *Deccan. Culture, Heritage and Literature*: 105–39. New Delhi: Department of History, Central University of Karnataka and Manak Publications.

Kennedy, M. 2017. 'Their tombs were their monuments': under the skin of the Russians' wild ancestors. *The Guardian* 31st May: 3.

Kennet, D. with contributions by B. Ulrich and S. Le Maguer 2013. *Kadhima. Kuwait in the Early Centuries of Islam*. Kuwait: National Council for Culture, Arts and Letters.

Kenoyer, J.M. 2003. Stone Beads and Pendant Making Techniques, in J.W. Lankton (ed.) *A Bead Timeline: Vol. 1 Prehistory to 1200 CE*: 14–19. Washington, DC: The Bead Museum.

Kenoyer, J.M. 2005. Bead Technologies at Harappa, 3300–1900 BC: A Comparative Summary, in C. Jarrige and V. Lefèvre (eds) *South Asian Archaeology 2001. Proceedings of the Sixteenth International Conference of the European Association of South Asian Archaelogists, held in Collège de France, Paris 2–6 July 2001*: vol. I, 157–70. Paris: Éditions Recherche sur les Civilisations and ADPF (two volumes).

Kenoyer, J.M. 2007. Stone beads in Ancient South Asia 7000–600 BC: A comparative approach to technology, style, and ideology, in J. Allen and V. Hector (eds) *The Global Perspective of Beads and Beadwork: History, Manufacture, Trade, and Adornment*: 1–12. Istanbul: Kadir Has University.

Kenoyer, J.M. 2017. History of Stone Beads and Drilling: South Asia, in A.K. Kanungo (ed.) *Stone Beads of South and Southeast Asia: Archaeology, Ethnography and Global Connections*: 127–50. Gandhinagar and New Delhi: Indian Institute of Technology and Aryan Books International.

Kenoyer, J.M. 2020. Bleached carnelian beads of the Indus Tradition, 3rd millennium BC: origins and variations, in I.L. Finkel and St J. Simpson (eds) *In Context: the Reade Festschrift*: 169-182. Oxford: Archaeopress Archaeology.

Kenoyer, J.M., M. Vidale and K.K. Bhan 1991. Contemporary Stone Beadmaking in Khambhat, India: Patterns of Craft Specialization and Organization of Production as reflected in the Archaeological Record. *World Archaeology* 23/1: 44–63.

Kenoyer, J.M., M. Vidale and K.K. Bhan 1994. Carnelian Bead Production in Khambhat India: An Ethnoarchaeological Study, in B. Allchin (ed.) *Living Traditions: Studies in the Ethnoarchaeology of South Asia*: 281–306. New Delhi / Bombay / Calcutta: Oxford and IBH Publishing Co.

Kepinski, C. 2010. The burial mounds of the Middle Euphrates (2100-1800 B.C.) and their links with Arabia: the subtle dialectic between tribal and state practices, in L. Weeks (ed.) *Death and Burial in Arabia and Beyond. Multidisciplinary Perspectives* (Society for Arabian Studies Monographs 10): 165–71. Oxford: Archaeopress.

Kettering, K. 2017. Baron Stieglitz, the Polovstov Family, and the Pursuit of Art, in M. Kelly Trombly (ed.) *Fabergé and the Russian Crafts Tradition: An Empire's Legacy*: 21–30. London and Baltimore: Thames and Hudson and The Walters Museum.

Khabdulina, M.K., D.T. Tleugabulov, T.V. Brynza, G.D. Bilyalova and P.Yu. Kucherov 2017. *Issledovaniye pamyatnikov bronzovogo veka v Akmolinskom Priishim'ye (poseleniye Shagalaly II)*. Astana: Eurasian National University named after L.N. Gumilyov, Faculty of History, Scientific Research Institute of Archaeology named after K.A. Akishev.

Khavrin, S.V. 2005. Spektralnyy analiz bronzovykh izdeliy skifskogo vremeni Sayano-Altaya i problemy khronologii tagarskoy kultury, in G.G. Korol (ed.) *Arkheologiya Yuzhnoy Sibiri: idei, metody, otkrytiya*: 96–98. Krasnoyarsk: Krasnoyarsk State Pedagogical University named after V.P. Astafyev.

Khazanov, A.M. 1975*a*. *Zoloto Skifov*. Moscow: Soviet Art.

Khazanov, A.M. 1975*b*. *Sotsialnaya istoriya skifov. Osnovnye problemy razvitiya drevnikh kochevnikov evraziyskikh stepey*. Moscow: Russian Academy of Sciences.

Khazanov, A.M. 1978. The Early State among the Scythians. *The Early State* 32: 425.

Khazanov, A.M. 1981. The Early State among the Eurasian nomads. *The study of the state*: 156–73.

Khazanov, A.M. 1984. *Nomads and the Outside World*. Cambridge: Cambridge University Press.

Khazanov, A.M. 1994. *Nomads and the Outside World*. University of Wisconsin Press (second edition).

Khazanov, A.M. 2015. The Scythians and their neighbors, in R. Amitai and M. Biran (eds) *Nomads as Agents of Cultural Change: The Mongols and their Eurasian predecessors*: 32–49. Honolulu: University of Hawaii Press.

Khazanov, A.M. 2016. Notes on the Scythian Political Culture, in I. Zimonyi and O. Karatay (eds) *Central Eurasia in the Middle Ages: Studies in Honour of Peter B. Golden*: 171–88. Wiesbaden: Harrassowitz.

Khazanov, A.M. and A. Wink (eds) 2001. *Nomads in the Sedentary World*. Richmond: Curzon.

Khrapunov, I.N. 1995. *Ocherki yetnicheskoy istorii Kryma v rannem zheleznom veke. Tavry. Skify. Sarmaty*. Simferopol: Tavrija.

Khrapunov, I.N. 2004. Etnicheskaja istorija Kryma v rannem zheleznom veke. *Bosporskie issledovanija* 6.

Simferopol and Kerch: Kerchenskaya gorodskaya tipografiya.
Khudaverdyan, A.Y. 2012. Bioarchaeological analysis of human skeletal remains of Iron Age from the Shirakavan cemetery, Shirak Plateau, Armenia. *Advances in Anthropology* 2: 224–33.
Khudyakov, Yu.S. 2005. Sedla drevnikh tyurok Tsentralnoy Azii, in V.I. Soyonov and V.P. Oynoshev (eds) *Izucheniye istoriko-kulturnogo naslediya narodov Yuzhnoy Sibiri*: 119–43. Gorno-Altaysk: Agency on the Cultural and Historical Heritage of the Altai Republic.
Kilunovskaya, M. and P. Leus 2018*a*. Archaeological discoveries in Tuva: excavations of the Ala-Tey and Terezin cemeteries of the Xiongnu period in 2015–2016. *Asian Archaeology* 1/1: 45–62.
Kilunovskaya, M. and P. Leus 2018*b*. Recent Excavations of Xiongnu Graves on the Left Bank of the Ulug-Khem in Tuva. *The Silk Road* 16: 1–20 [https://edspace.american.edu/silkroadjournal/v16_2018_kulinovskaya_leus/].
Kingma, K. and R. Hemley 1994. Raman spectroscopic study of microcrystalline silica. *American Mineralogist* 79: 269–73.
Kirby, D., M. Buckley, E. Promise, S.A. Trauger and T.R. Holdcraft 2013. Identification of collagen-based materials in cultural heritage. *Analyst* 138: 4849–58.
Kircho, L.B. 1975. 'Kovry' na cherepkakh. *Pamyatniki Turkmenistana* 2/20: 11–12. Ashgabat.
Kiryushin, Yu.F. and A.A. Tishkin 1997. *Skifskaya epokha Gornogo Altaya. Ch. I: Kultura naseleniya v ranneskifskoe vremya*. Barnaul: Altai State University Press.
Kisel, V.A. 1994. Neskol'ko zamechaniy ob obraze koshach'ego khishchnika v rannem skifskom iskusstve, in A.Yu. Alekseyev, N.A. Bokovenko, L.S. Marsadolov and Vl.A. Semenov (eds) *Elitnye kurgany stepey Evrazii v skifo-sarmatskuyu epokhu) (Arkheologicheskie izyskaniya)* 18: 111–19. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Sciences.
Kisel, V.A. 2003. *Shedevry yuvelirov Drevnego Vostoka iz skifskikh kurganov*. St. Petersburg: St. Petersburg Oriental Studies.
Kisel, V.A. 2015*a*. Istorichnost 'Skifskogo logosa' i avtopsiya Gerodota, in Yu.K. Chistov (ed.) *Radlovsky sbornik. Nauchnye issledovaniya i muzeynye proekty MAE RAN v 2014*: 406–17. St. Petersburg: Museum of Anthropology and Ethnography, Russian Academy of Sciences.
Kisel, V.A. 2015*b*. O dvuh ehpizodah skifskoj istorii v sochinenii Gerodota, in E.F. Korolkova (ed.) *Arheologiya bez granic: kollekcii, problemy, issledovaniya, gipotezy. Trudy gosudarstvennogo Ermitazha* 77: 213–33.
Kiselev, S.V. 1951. *Drevnyaya istoriya Yuzhnoy Sibiri*. Moscow: Russian Academy of Sciences.
Kiyashko, V.Ya. and V.A. Korenyako 1976. Pogrebeniye rannego zheleznogo veka u g. Konstantinovska-na-Donu. *Sovetskaya Arkheologiya* 1976/1: 170–77.
Klepikov, V.M. 2000. Pamyatniki III v. do n.e. v Nizhnem Povolzhe, in *Rannesarmatskaya kultura: formirovanie, razvitie, khronologiya. Materialy IV mezhdunarodnoy konferentsii 'Problemy sarmatskoy arkheologii i istorii'*: vol. 1, 116–24.
Klepikov, V.M. 2002. *Sarmaty Nizhnego Povolzhya IV–III vv. do n.e.*. Volgograd: Volgograd University.
Klepikov, V.M. and A.S. Skripkin 2002. Khronologiya rannesarmatskih pamyatnikov Nizhnego Povolzhya. *Nizhnevolzhskiy arkheologicheskiy vestnik* 2002/5: 47–81.
Klepikov, V.M., A.S. Skripkin and I.V. Sergatskov 2008. Prokhorovskaya kultura v Nizhnem Povolzhe: stanovlenie i transformatsiya, in L.T. Yablonsky (ed.) *Rannie kochevniki Volgo-Uralskogo regionaю Materialy mezhdunarodnoy nauchnoy konferentsii 'Rannie kochevniki Yuzhnogo Priuralya v svete noveyshih arkheologicheskih otkrytiy', 21–25 aprelya 2008 g.*: 50–63. Orenburg: OGPU.
Knauer, E.R. 1978. Towards a History of the Sleeved Coat. A Study of the Impact of an Ancient Eastern Garment on the West. *Expedition* 21/1: 18–36.
Knauer, E.R. 1985. Ex Oriente Vestimenta. *Aufstieg und Niedergang der Romische Welt* (H. Temporini and W. Haase), *Part II Principät*, 12.3: 578–741. Berlin and New York: Walter de Gruyter.
Knauer, E.R. 2003. A Quest for the Origins of the Persian Riding Coats: Sleeved Garments with Underarm Openings, in C. Fluck and G. Vogelsang-Eastwood (eds) *Riding Costume in Egypt. Origin and Appearance*: 7–28. Leiden: E.J. Brill.
Koch, H. 2001. *Persepolis: Glänzende Hauptstadt des Perserreichs*. Mainz am Rhein: Philipp von Zabern.
Kohl, P.L. 2002. Archaeological transformations: Crossing the pastoral/agricultural bridge. *Iranica Antiqua* 37: 151–90.
Kolotukhin, V.A. 2000. *Kimmeriytsy i skify Stepnogo Kryma*. Simferopol: Sonat.
Koltukhov, S.G. 1999. *Ukreplenija Krymskoj Skifii*. Simferopol: Sonat.
Koltukhov, S.G. 2004. Varvarskie poselenija klassicheskogo i rannejellinisticheskogo vremeni v Vostochnom i Jugo-vostochnom Krymu. *Drevnosti Bospora* 7: 217–37.
Koltukhov, S.G. 2006. Kurgan IV Akkayskogo (Belogorskogo) kurgannogo mogilnika. *Drevnosti Bospora* 9: 228–59.
Koltukhov, S.G. 2007. Osnovnoe pogrebenie kurgana Besh-Oba IV/2, in Yu.P. Zaitsev and V.I. Mordvintseva (eds) *Drevnyaya Tavrika. Posvyaschaetsja 80-letiyu T.N. Vysotskoy*: 193–206. Simferopol: Universum.
Koltukhov, S.G. 2012. *Skify Krymskogo Prisivashja v VII–IV vv. do n.e. Pogrebalniye Pamyatniki. Landshaftno-istoricheskoe rayonirovanie arkheologicheskikh pamyatnikov Kryma*. Simferopol: 'Predprijatie Fenix'.
Komaroff, L. (ed.) 2011. *Gifts of the Sultan: The Arts of Giving at the Islamic Courts*. New Haven: Yale University Press.

Komarova, M.N. 1981. Svoyeobraznaya gruppa eneoliticheskikh pamyatnikov na Yeniseye, in T.N. Troitskaya (ed.) *Problemy zapadno-sibirskoy arkheologii. Epokha kamnya i bronzy*: 76–90. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Komissarov, S.A. 2005. K voprosu o proiskhozhdenii stremyan, in A.A. Tishkin (ed.) *Snaryazheniye kochevnikov Evrazii*: 127–29. Barnaul: Publishing House of Altai University.

Konow, S. (ed.) 1991. *Kharoshṭhī Inscriptions with the exception of those of Aśoka* (Corpus Inscriptionum Indicarum, CII II/2). Delhi: Archaeological Survey of India (reprint).

Kopeikina, L.V. 1986. Zolotye blyashki iz kurgana Kul-Oba, in N.L. Grach (ed.) *Antichnaja toreutika*: 28–63. Leningrad: State Hermitage Museum.

Kopylov, V.P. 2002. Nizhniy Don i Bospor Kimmeriysky v tret'ey chetverti VII – pervoj treti III vv. do n.e., in M.Yu. Vakhtina, V.Yu. Zuyev, E.Ya. Rogov and V.A. Khrshanovskiy (eds) *Bosporskij fenomen. Pogrebalnye pamyatniki i svyatilischa* 1: 229–35. St. Petersburg: State Hermitage Museum.

Korenyako, V.A. 2001. Kurgan ranneskifskogo vremeni u sela Novozavedennogo v Stavropolskom kraye, in M.P. Abramova and V.I. Markovin (eds) *Severny Kavkaz: istoriko-arkheologicheskiye ocherki i zametki (Materialy i issledovaniya po arkheologii Rossii)* 3: 52–64. Moscow: Institute of Archaeology, Russian Academy of Sciences.

Korolkova, E.F. 2001. Filippovskie kurgany i zveriny stil', in R.G. Kuzeeva and M.B. Piotrovsky (eds) *Zolotye oleni Evrazii*: 64–163. St. Peterburg: 'Slaviya'.

Korolkova, E.F. 2003. Ritualnyye chashi s zoomorfnym dekorom v kultura rannikh kochevnikov. *Arkheologichesky sbornik gosudarstvennogo Ermitazha* 36: 28–60.

Korolkova, E.F. 2006. *Zverinyy stil' Evrazii. Iskusstvo plemen Nizhnego Povolzhya i Yuzhnogo Priuralya v skifskuyu epokhu (VII–IV vv. do n.e.). Problemy stilya i etnokulturnoy prinadlezhnosti*. St. Petersburg: St. Petersburg Oriental Studies.

Korolkova, E.F. 2009. Sarmatischer Schmuck und sibirisches Gold antiker Nomaden in Gold der Steppe, in W. Seipel (ed.) *Sensationsfunde aus fürstengräbern der scythen und sarmaten*: 42–57. Vienna: Kunsthistorisches Museum.

Korolkova, E.F. 2011. Konskii 'egret' so scenoi terzanija iz Sibirskoi kollektsii Petra I. *Soobscheniya gosudarstvennogo Ermitazha* 69: 5–13.

Korolkova, E.F. 2017*a*. The Siberian Collection of Peter the Great, in St J. Simpson and S. Pankova (eds) *Scythians: warriors of ancient Siberia*: 32–67. London: Thames and Hudson.

Korolkova, E.F. 2017*b*. O proiskhozhdenii nekotorykh osobennostey sibirskogo zverinogo stilya, in N.A. Makarov (ed.) *Kratkie soobschenia Instituta arkheologii* 247: 50–60. Moscow: Publishing house 'Yask'.

Korolkova, E.F. 2017*c*. Ob absolyutnosti i absolyutnoy khronologii arkhaicheskoy Skifii i yeye vysotnykh reporov. *Archeologiya i davnyaya istoriya Ukrainy* 23/2: 465–69.

Korolyuk, E.A. 2003. Krasil'nye rasteniya Altaya i sopredel'nykh territoriy, in N.G. Bazarnova (ed.) *Khimiya rastitel'nogo syr'ya* 1: 101–35.

Korovina, A.K. 1957. K voprosu ob izuchenii Cemibratnikh kurganov. *Sovetskaya Arkheologiya* 1957/2: 179–87.

Koryakova, L. 2000. On the Northern Periphery of the Nomadic World: Research in the Trans-Ural Region, in J. Aruz, A. Farkas and E. Valtz Fino (eds) *The Golden Deer of Eurasia. Perspectives on the Steppe Nomads of the Ancient World* (Metropolitan Museum of Art Symposia): 102–13. New York: Metropolitan Museum of Art.

Koryakova, L. and A.V. Epimakhov 2007. *The Urals and Western Siberia in the Bronze and Iron Ages*. Cambridge: Cambridge University Press.

Kossack, G. 1998. Ostentatious Graves. Remarks about Their Nature and Interpretative Value, in B. Hänsel and A. Harding (eds) *Towards Translating the Past*: 13–37. Rahden: Marie Leidorf.

Kost, C. 2017. Heightened Receptivity: Steppe Objects and Steppe Influences in Royal Tombs of the Western Han Dynasty. *Journal of American Oriental Society* 137/2: 349–81.

Kovalenko, A.N. 2006. Naselenie Nizhnego Dona vtoroj poloviny IV – pervoj treti III vv. do n.e., in *Mezhdunarodnye otnoshenija v bassejne Chernogo morja v drevnosti i srednie veka. Sbornik statej po materialam XI mezhdunarodnoj nauchnoj konferentsii*: 51–57. Rostov-on-Don: NMCA RGPU.

Kovalev, A.A. 1987. O zakhoroneniyakh loshadey v Kelermesskikh kurganakh (k razrabotkam M.P. Gryaznov), in anon. (ed.) *Istoricheskiye chteniya pamyati M.P. Gryaznov*: 29–30. Omsk: Omsk State University Press.

Kovaleva, O.V. 2013. Risunki na plitakh i stelakh kurgana Barsuchiy log. *Sayano-Altayskiy nauchnyy obzor* 5/1: 91–119.

Kovalevskaya, V.B. 2001. Torgovyye puti Severnogo Kavkaza v rannem srednevekov'ye (po dannym obrabotki komp'yuternykh kart raspredeleniya serdolikovykh bus V-IX vv.). *Drevniye tsivilizatsii Yevrazii. Istoriya i kul'tura: Materialy mezhdunarodnoy nauchnoy konferentsii, posvyashchonnoy 75-letiyu B.A. Litvinskogo*: 227–42. Moscow: 'Oriental Literature', Russian Academy of Sciences.

Kovpanenko, G., S. Bessonova and S. Skory 1989. *Pamyatniki skifskoy epokhi Dneprovskogo lesostepnogo pravoberezhja (Kiyevo-Cherkasskiy region)*. Kiev: 'Naukova Dumka'.

Kozak, A.D. 2018. Soprovozhdayushchiye pogrebeniya v trizne Aleksandropolskogo kurgana. K antropologii skifskogo vremeni, in S.V. Polin and A.Yu. Alekseev (eds) *Skifskiy tsarskiy Aleksandropolskiy kurgan IV v.*

do n.e. v Nizhnem Podneprovye (Kurgany Ukrainy 6): 632–76. Kiev: 'Naukova Dumka'.

Kozenkova, V.I. 1982. *Tipologiya i khronologicheskaya klassifikatsiya predmetov kobanskoy kultury. Vostochny variant* (Collection of Archaeological Sources B2-5). Moscow: Russian Academy of Sciences.

Kozenkova, V.I. 2004. Biritualism v pogrebalnom obryade drevnikh 'kobantsev', in *Mogilnik Tereze kontsa XII-VIII vv. do n.e.* (Materialy po izucheniyu istoriko-kulturnogo naslediya Severnogo Kavkaza V). Moscow: Monuments of Historical Thought.

Kozenkova, V.I. 2013. *Kobanskaya kultura i okruzhayushchiy mir (vzaimosvyazi, problemy sudby i sledov raznokulturnykh infiltratsiy v mestnoy srede)*. Moscow: Taus.

Kozhin, P.M. 2012. Lepnaya keramika kochevnikov razvitogo bronzovogo veka v Sredney Azii. *Trudy Margianskoy Arkheologicheskoy Ekspeditsii* 4: 199–221.

Kozintsev, A.G. 2007. Skify Severnogo Prichernomorya: mezhgruppovye razlichiya, vneshniye svyazi, proiskhozhdeniye. *Arkheologiya, Etnografiya i Antropologiya Evrazii* 32 (2007/4): 143–58.

Kozintsev, P. and Z. Samashev 2014. *Berel horses. Morphological research* (Collection: Materials and researches on archaeology of Kazakhstan). Astana.

Kozlov, P.K. 1925. Severnaya Mongolia – Noin-Ulinskiye pamyatniki. *Kratkiye otchyoty ekspeditsiy po issledovaniyu Severnoy Mongolii v svyazi s Mongolo-Tibetskoy Ekspeditsii P.K. Kozlov*: 7–12. Leningrad: Soviet Academy of Sciences.

Kozlov, P.K. 1926. Noyon-Ulskiye kurgany. *Vestnik Manchurii* 1/2: 51–56.

Kozlov, P.K. 1928. *Kratky otchyot o Mongolo-Tibetskoy ekspeditsii gosudarstvennogo russkogo geographicheskogo obshchestva 1923–1926: Severnaya Mongolia, III*. Leningrad: Soviet Academy of Sciences.

Kožomberdieva, E.I., I.K. Kožomberdiev and P.N. Kožomjako 1998. Ein Katakombengrab aus der Schlucht Samsi. *Eurasia Antiqua* 4: 451–71.

Kozub, Yu. I. 1973. Model luka iz Olvii, in A.I. Terenozhkin (ed.) *Skifskiye drevnosti*: 270–75. Kiev: 'Naukova Dumka'.

Krader, L. 1963. *Social Organization of the Mongol-Turkic Pastoral Nomads*. The Hague: Mouton.

Kradin, N.N. 2006. Kochevniki, mir-imperii i sotsialnaya evolutsiya, in L.E. Grinin, D.M. Bondarenko, N.N. Kradin and A.V. Korotaev (eds) *Rannee gosudarstvo, ego alternativy i analogy*: 490–511. Volgograd: Uchitel.

Kradin, N.N. 2007. *Kochevniki Evrazii*. Almaty: Dyke Press.

Kradin, N.N. 2011. Stateless Empire: The structure of the Xiongnu nomadic super-complex chiefdom, in U. Brosseder and B.K. Miller (eds) *Xiongnu Archaeology: multidisciplinary perspectives of the first steppe empire in Inner Asia* (Bonn Contributions to Asian Archaeology 5): 77–96. Bonn: Vor- und Frühgeschichtliche Archäologie, Rheinische Friedrich-Wilhelms-Universität Bonn.

Kradin, N.N. 2014. *Nomads of Inner Asia in transition*. Moscow: Krasand.

Kradin, N.N. 2018. *Ancient Steppe Nomad Societies* (Oxford Research Encyclopaedia, Asian History). Oxford: Oxford University Press.

Kraeva, L.A. and E.A. Kuptsov 2007. Novyye dannyye o konstruktsii goritov rannikh kochevnikov Yuzhnogo Priaral'ya, in L.T. Yablonsky and A.D. Tairov (eds) *Problemy sarmatskoy arkheologii i istorii. Vooruzheniye sarmatov: regional'naya tipologiya i khronologiya*: 30–37. Chelyabinsk: Izdatelstvo YuUrGU.

Kratkiye Otchyoty Expeditsiy po issledovaniyu Severnoy Mongolii v svyazi s Mongolo-Tibetskoy Expeditsiyey P.K. Kozlova. 1925. Leningrad: Soviet Academy of Sciences.

Kreyenbroek, G. 1985. *Sraoša in the Zoroastrian Tradition*. Leiden: E.J. Brill.

Kruglikova, I.T. 1975. *Sel'skoe hozjajstvo Bospora*. Moscow: Russian Academy of Sciences.

Kruglikova, I.T. 1984. Bulli iz Djiga-tepe. *Drevnyaya Baktriya. Materiali Sovetsko-Afghanskoi ekspeditsii* 3: 141–51. Moscow: Russian Academy of Sciences.

Krupa, T.M. 2001. Issledovaniye sostava krasitelei arkheologicheskih tkanei vtoroi poloviny VII v. do n.e. – IV v. n.e., in *Problemy zberezhennya, konservatsiyi, restavratsiyi ta ekspertyzy muzeinyh panyatok. Tezy dopovidei III Mizhnarodnoyi naukovo-praktychnoyi konferentsiyi. 22-24 travnya 2001*: 84–85. Kiev: Ukrainian Academy of Sciences.

Kruts, S.I. 2005. Novÿe antropologicheskie materialÿ iz kurganov skifskoï znati Severnogo Prichernomor'ya, in B.N. Mozolevsky and S.V. Polin (eds) *Kurgany Skifskogo Gerrosa IV v. do n.e. (Babina, Bodyana i Soboleva mogily)*: 459–501. Kiev: 'Stilos'.

Kryzhitskii, S.D. 1982. *Zhilye doma antichnykh gorodov Severnogo Prichernomoria: VI v. do n.e. –IV v. n.e.* Kiev: 'Scientific Opinion'.

Kubarev, V.D. 1981. Kinzhaly iz Gornogo Altaya, in Yu.S. Khudyakov (ed.) *Voyennoye delo drevnikh plemen Sibiri i Tsentralnoy Azii*: 29–54. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Kubarev, V.D. 1987. *Kurgany Ulandryka.* Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Kubarev, V.D. 1988. *Drevnie rospisi Karakola*. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Kubarev, V.D. 1991. *Kurgany Ustyda*. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Kubarev, V.D. 2009. *Pamyatniki karakolskoy kultury Altaya*. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Kubishev, A.I., S.S. Bessonova and N.V. Kovalev 2009. *Bratolyubovskiy kurgan*. Kiev: 'Korvinpress'.

Kuhrt, A. 2007. *The Persian Empire. A Corpus of Sources from the Achaemenid Period*. London: Routledge.

Kulishev, V.S. and N.Zh. Saparov 2016. Paykendskiy klad 2014 goda, in D.K. Mirzaakhmedov and A.V. Omelchenko (eds) *Materialy Bukharskoi Arkheologicheskoi Ekspeditsii* 13: 65–67, figs 125–27. St. Petersburg: State Hermitage Museum.

Kull, B. 1997. Tod und Apotheose. Zur Ikonographie in Grab und Kunst der jüngeren Eisenzeit an der unteren Donau und ihrer Bedeutung für die Interpretation von 'Prunkgräbern'. *Bericht der Römisch-Germanischen Kommission* 78: 197–466.

Kumamoto, H. 2009. Khotan, ii. history in the pre-Islamic period, in E. Yarshater (ed.) *Encyclopaedia Iranica*, accessed 27th October 2017 <http://www.iranicaonline.org/articles/khotan-i-pre-islamic-history>

Kumar, R. 1999. *Costumes and Textiles of Royal India*. London: Antique Collectors' Club Art Books.

Kundo, L.P. 2005. 'Zhiviye' krasiteli pazyrykskogo tekstilya, in N.V. Polosmak and L.L. Barkova (eds) *Kostyum i tekstil' pazyryktsev Altaya (IV–III vv. do n.e.)*: 206–11. Novosibirsk: Infolio Press.

Kushakova, N.A. and K.V. Chugunov 2010. Pogrebalnyy kompleks s cherepami zhivotnykh v Tsentralnoy Tyve. *Tsentralnaya Aziya i Pribaykalye v drevnosti* 4: 148–56.

Kushnareva, K.Kh. 1977. *Drevneyshiye pamyatniki Dvina*. Yerevan: Academy of Sciences of the Amenian SSR.

Kuttner, R. 1978. The linguistic affinities of the Scyths. *The Mankind Quarterly* 18: 222–26.

Kuzmin, N.Yu. 2006. Okunevsky kod v semantike tesinsko-tashtykskoy raskraski masok, in D.G. Savinov and M.L. Podolsky (eds) *Okunevsky sbornik-2. Kultura i ee okruzheniye*: 343–51. St. Petersburg: St. Petersburg University Press.

Kuzmin, N.Yu. 2011. *Pogrebalniye pamyatniki khunno-syan'biyskogo vremeni v stepyakh Srednego Eniseya: Tesinskaya kultura*. St. Petersburg: Aysing Press.

Kuzmina, E.E. 1977. Les relations entre la Bactriane and l'Iran du VIIIe au IVe siècle BC, in J. Deshayes (ed.) *Le plateau iranien and l'Asie centrale des origines à la conquête islamique*: 201–14. Paris: Éditions du CNRS.

Kuzmina, E.E. 1987. Syuzhet borby khishchnika i kopytnogo v iskusstve 'zverinogo' stilya evraziyskikh stepey skifskoy epokhi, in A.I. Martynov and V.I. Molodin (eds) *Skifo-sibirskiy mir. Iskusstvo i ideologiya*: 3–12. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Kuzmina, E.E. 2003. Historical perspectives on the Andronovo and early metal use in eastern Asia, in K.M. Linduff (ed.) *Metallurgy in Ancient Eastern Eurasia from the Urals to the Yellow River* (Chinese Studies 31): 37-84. Lampeter: The Edwin Mellen Press.

Kuzmina, E.E. 2007. *The Origin of the Indo-Iranians*. Leiden: E.J. Brill (translated by S. Pitina and P. Prudovsky).

Kuzminykh, S.V. 1983. *Metallurgiya Volgo-Kamya v rannem zheleznom veke. Med i bronza*. Moscow: Russian Academy of Sciences.

Kuznetsov, V. and A.B. Niktin 2019. An Old Persian Inscription from Phanagoria. *Ancient Civilizations from Scythia to Siberia* 25/1: 1–7.

Kuznetsova, T.M. 2016. Kelermessky mogilnik i sistema skifskoy khronologii arkhaicheskogo perioda, in A.S. Balakhvantsev and S.V. Kullanda (eds) *Kavkaz i step na rubezhe epokhi bronzy i rannego zheleza*: 124–34. Moscow: Institute of Oriental Studies, Russian Academy of Sciences.

Kyzlasov, L.R. 1960. *Tashtykskaya epokha v istorii Khakassko-Minusinskoy kotloviny*. Moscow: Moscow University Press.

Kyzlasov, L.R. 1964. O naznachenii drevnetyurkskikh kamennykh izvayaniy, izobrazhayushchikh lyudey. *Sovetskaya Arkheologiya* 1964/2: 27–39.

Kyzlasov, L.R. 1969*a*. *Istoriya Tuvy v sredniye veka*. Moscow: Moscow State University Press.

Kyzlasov, L.R. 1979. *Drevnyaya Tuva (ot paleolita do IX veka)*. Moscow: Moscow State University Press.

Kyzlasov, L.R. 1987. Pismo iz eneolita (izucheniye v Khakasii unikalnogo pamyatnika – kromlekha kultovogo sooruzheniya epokhi neolita), in V.P. Shilov (ed.) *Zadachi sovetskoy arkheologii v svete resheniy XXVII syezda KPSS: tezisy dokladov vsesoyuznoy konferentsii:* 143–45. Moscow: Institute of Archaeology, Soviet Academy of Sciences.

Kyzlasov, L.R. and S.V. Pankova 2004. Tatuirovka drevney mumii iz Khakasii (rubezh nashei ery). *Soobshcheniya gosudarstvennogo Ermitazha* 62: 61–67.

La Guérinière, F.R. de 2009. *Konnaya bibliya. Shkola verkhovoy ezdy*. Moscow: Acquarium Press (translation from the French by S.N. Nizov).

Lahiri, N. 1992. *The Archaeology of Indian Trade Routes up to c. 200 BC. Resource Use, Resource Access and Lines of Communication*. Delhi: Oxford University Press.

Lancaster, W. 1981. *The Rwala Bedouin Today*. Cambridge: Cambridge University Press.

Lang, A. 2012. Urartu und die Nomaden – Zur Adaption altorientalischer Motive im reiternomadischen Kunsthandwerk des 7. und 5. Jh. v. Chr. In Eurasien, in S. Kroll, C. Gruber, U. Hellwag, M. Roaf and P. Zimansky (eds) *Biainili-Urartu. The proceedings of the symposium held in Munich 12–14 October 2007*: 281–93. Leuven: Peeters.

Lankton, J.W., J. Diamanti and M. Kenoyer 2003. *A Bead Timeline. Volume I: Prehistory to 1200 CE. A Resource for Identication, Classification and Dating*. Washington, D.C.: The Bead Society of Greater Washington.

Lateiner, D. 1989. *The Historical Method of Herodotus*. Toronto: University of Toronto Press.

Latyshev, V.V. 1948. Izvestiya drevnikh pisateley grecheskikh i latinskikh o Skifii i Kavkaze. *Vestnik drevnei istorii* 1948/2: 217–332.

La Vaissière, E. de 2007. A Note on the Schøyen Copper Scroll: Bactrian or Indian? *Bulletin of the Asia Institute* 21 (N.S.): 127–30.

La Vaissière, E. de 2015. The Steppe World and the Rise of the Huns, in M. Maas (ed) *The Cambridge Companion to the Age of Attila*: 175–192. Camridge: Cambridge University Press.

Law, R.W. 2011. *Inter-regional Interaction and Urbanism in the Ancient Indus Valley: A Geologic Provenience Study of Harappa's Rock and Mineral Assemblage* (Occasional Paper 11, Linguistics, Archaeology and the Human Past). Kyoto: Research Institute for Humanity and Nature.

Law, R., A. Carter, K. Bhan, A. Malik and M.D. Glascock 2012. INAA of Agate Sources and Artifacts from the Indus, Helmand, and Thailand Regions, in D. Frenez and M. Tosi (eds) *South Asian Archaeology 2007. Proceedings of the 19th International Conference of the European Association of South Asian Archaeology Ravenna, Italy, 2-6 July 2007. Volume I. Prehistoric Periods* (BAR International Series 2454): 177–84. Oxford: British Archaeological Reports.

Layard, A.H. 1853. *The Monuments of Nineveh*. London: John Murray.

Lazaretov, I.P. 2007. Pamyatniki bainovskogo tipa i tagarskaya kultura. *Arkheologicheskie Vesti* 14: 93–105. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Science.

Lazaretov, I.P. 2012. Okunevskiye kurgany s diagonalnymi kladkami, in V.A. Alekshin *et al.* (eds) *Kultury stepnoy Evrazii i ikh vzaimodeystviye s drevnimi tsivilizatsiyami. Materialy mezhdunarodnoy nauchnoy konferentsii, posvyashchennoy 110-letiyu so dnya rozhdeniya M.P. Gryaznova*: vol. 2, 220–24. St. Petersburg: 'Periphery' and Institute of the History of Material Culture, Russian Academy of Sciences.

Lazaretov, I.P., A.V. Polyakov, Yu.N. Esin and N.I. Lazaretova 2012. Novye dannye po formirovaniyu okunevskogo kulturnogo fenomena, in A.P. Derevyanko, A.B. Kudelin and V.A. Tishkov (eds) *Istoriko-kulturnoye naslediye i dukhovnye tsennosti Rossii*: 130–36. Moscow: ROSSPEN Press.

Lazarevsky, Ya. 1894. Aleksandropolskij kurgan. Mogila skifskogo carja. *Zapiski rossiyskogo arkheologicheskogo obschestva* 7/1–2: 24–46.

Le Bailly, M., S. Lepetz, Z. Samashev, H.-P. Francfort and F. Bouchet 2008. Palaeoparasitological study of gastro-intestinal content in horses at a scythian kurgan (3rd century BC) found in Kazakhstan. *Anthropozoologica* 43/2: 69–75.

Lebedeva, E.Y. 2005. Arkheobotanika i izuchenie zemledeliya epokhi bronzy Vostochny Evropy. *Opus: Mezhdistsiplinarnye Issledovaniya v Arkheologii* 4: 50–68.

Lebedynsky, I. 2001. *Les Scythes. La civilisation des steppes (VIIe-IIIe av. J.-C.)*. Paris: Errance.

Lebedynsky, I. 2003. *Les Nomades. Les peuples nomades de la steppe des origines aux invasions mongoles IX^e siècle av. J.-C.–XIII^e siècle apr. J.-C.*. Paris: Errance.

Lebedynsky, I. 2006. *Les Saces. Les 'Scythes' d'Asie, VIII^e siècle av. J.-C.–IV^e siècle apr. J.-C.*. Paris: Errance.

Lebedynsky, I. 2010. *Les Scythes*. Paris: Errance (revised and expanded edition).

Lecoq, P. 1997. *Les inscriptions de la Perse achéménide* (trans and annot). [Paris]: Gallimard.

Lee, J.H., J.A. Han and S.T. Lim 2009. Effect of pH on aqueous structure of maize starches analyzed by HPSEC-MALLS-RI system. *Food Hydrocolloids* 23: 1935–939.

Leggett, W.F. 1944. *Ancient and Medieval Dyes*. New York: Chemical Press.

Legrand, S. 2003. Karasuk metallurgy: technological development and regional influence, in K.M. Linduff (ed.) *Metallurgy in Ancient Eastern Eurasia from the Urals to the Yellow River* (Chinese Studies 31): 139–56. Lampeter: The Edwin Mellen Press.

Leighton, C. 2017*a*. The BP exhibition 'Scythians: warriors of ancient Siberia'. *British Museum Middle East Newsletter* 2: 24–25.

Leighton, C. 2017*b*. Riding across Siberia. *The British Museum Magazine* 88 (autumn): 24–28.

Leighton, C. 2018. The BP exhibition 'Scythians: warriors of ancient Siberia'. *British Museum Middle East Newsletter* 3: 40–41.

Lenz, E.E. 1905. Zametki o predmetakh vooruzheniya iz raskopok 1903 g. bliz s. Zhurovki, Kievskoy gubernii. *Izvestiya Imperatorskoy arkheologicheskoy komissii* 14: 54–68.

Leontiev, N.V., V.F. Kapelko and Yu.N. Esin 2006. *Izvayaniya i stely okunevskoy kultury*. Abakan: Khakassia Book Publishers.

Lepetz, S. 2013. The sacrifice of horses in a Pazyryk culture kurgan: the princely tomb of Berel' (Kazakhstan). Criteria for choice and slaughter procedure. *Anthropozoologica* 48/2 (*Animals in Funerary Space*, edited by R.-M. Arbogast and S. Lepetz): 309–22. Paris.

Lerner, J. 1991. Some so-called Achaemenid Objects from Pazyryk. *Source: Notes in the History of Art* 10/4: 8–15.

Lerner, J. 1996. Horizontal-Handled Mirrors: East and West. *Metropolitan Museum Journal* 31: 11–40.

Lerner, J.A. and N. Sims-Williams (eds) 2011. *Seals, Sealings and Tokens from Bactria to Gandhara (4th to 8th century CE)* (Denkschriften der phil.-hist. Klasse der Österreichischen Akademie der Wissenschaften 421). Vienna: Austrian Academy of Sciences.

Leshnik, L.S. 1974. *South Indian 'Megalithic' Burials: The Pandukal Complex*. Wiesbaden: Franz Steiner.

Leskov, A.M. 1972. *Novye sokrovishcha kurganov Ukrainy*. Leningrad: Aurora.

Letyagin, A.Yu., A.A. Savelov and N.V. Polosmak 2014. Vysokopol'naya magnitno-rezonansnaya tomografiya antropoarkheologicheskogo ob'yekta iz kurgana 1 mogil'nika Ak-Alakha-3 (Ukok): rezul'taty i interpretatsiya. *Arkheologiya, Etnografiya i Antropologiya Evrazii* 60 (2014/4): 83–91.

Leus, P. and S.V. Bel'skiy 2016. Terezin I – mogilnik vremen khunnu v tsentralnoy Tuve. *Arkheologicheskie Vesti* 22: 93–104.

Levine, M. 2000. Osobennosti paleopatalogiy loshadey epokhi rannego zheleza, in A.P. Derevyenko and V.I. Molodin (eds) *Fenomen altayskikh mumiy*: 243–49. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Levine, M., G.N. Bailey, K.E. Whitwell and L.B. Jeffcott 2000. Paleopathology and Horse Domestication: the case of some Iron Age horses from the Altaï Moutains, Siberia, in G. Bailey, R. Charles and N. Winder (eds) *Human Ecodynamics, Proceedings of the Association for Environmental Archaeology Conference 1998 held at the University of Newcastle upon Tyne*: 123–33. Oxford: Oxbow.

Levine, M., Y. Rassamakin, A. Kislenko and N. Tatarintseva 1999. *Late Prehistoric Exploitation of the Eurasian Steppe*. Cambridge: McDonald Institute.

Levinschi, A.N. 2005. Considerații asupra începuturilor de locuire a geților în silvostepa Moldovei (sec. VI î.e.n). *Tyragetia* 14: 63–70.

Leypunskaya, N. 2007. Olbian–Scythian Trade: Exchange Issues in the Sixth to Fourth Centuries BC, in D. Braund and S. Kryzhitsky (eds) *Classical Olbia and the Scythian World: From the Sixth Century BC to the Second Century AD*: 121–34. Oxford: Oxford University Press.

Li Fei, Li Shuicheng and Shui Tao 1993. Huluhe liuyu de gu wenhua yu gu huangjing [The ancient cultures and environment in the Hulu River Valley]. *Kaogu* 9: 822–42.

Li Wenying 2012. Silk artistry of the Qin, Han, Wei and Jin dynasties, in D. Kuhn (ed.) *Chinese Silks*: 115–67. New Haven / New York / Beijing: Yale University Press.

Liaoning Sheng Wenwu Kaogu Yanjiusuo and Chaoyang Shi Bowuguan 1997. Chaoyang Shi'ertai Xiang Zhuanchang 88M1 fajue jianbao [Excavation of a tomb (coded 88M1) in a Brickyard at Shiertai Township, Chaoyang]. *Wenwu* 11: 19–32.

Librado, P., C. Gamba, C. Gaunitz, C. Der Sarkissian, M. Pruvost, A. Albrechtsen, A. Fages, N. Khan, M. Schubert, V. Jagannathan, A. Serres-Armero, L.F.K. Kuderna, I.S. Povolotskaya, A. Seguin-Orlando, S. Lepetz, M. Neuditschko, C. Thèves, S. Alquraishi, A.H. Alfarhan, K. Al-Rasheid, S. Rieder, Z. Samashev, H.-P. Francfort, N. Benecke, M. Hofreiter, A. Ludwig, C. Keyser, T. Marques-Bonet, B. Ludes, E. Crubézy, T. Leeb, E. Willerslev and L. Orlando 2017. Ancient genomic changes associated with domestication of the horse. *Science* 356: 442–45.

Lieverse, A.R. 1999. Diet and the aetiology of dental calculus. *International Journal of Osteoarchaeology* 9: 219–32.

Lillie, M.C. 1996. Mesolithic and Neolithic populations of Ukraine: indications of diet from dental pathology. *Current Anthropology* 37: 135–42.

Lindholm, C. 1986. Kinship Structure and Political Authority: The Middle East and Central Asia. *Comparative Studies in Society and History* 20: 334–55.

Linduff, K.M. 2002*a*. Why have Siberian artifacts been excavated inside the ancient dynastic Chinese border?, in Yu. Piotrovsky (ed.) *Stepi Evrazii v drevnosti i srednevekove. K 100-letiyu so dnya rozhdeniya M.P. Gryaznov*: vol. I/2, 264–67. St. Petersburg: State Hermitage Museum and Institute of Archaeology, Russian Academy of Sciences.

Linduff, K.M. 2002*b*. At the eastern edge: metallurgy and adaptation in Gansu (PRC) in the 2nd millennium BC, in K. Jones-Bley and D.G. Zdanovich (eds) *Complex Societies of Central Eurasia from the 3rd to 1st Millennium BC. Regional Specifics in Light of Global Models*: 595–611. Washington D.C.: Institute for the Study of Man.

Linduff, K.M. 2006. Why have Siberian artefacts been excavated within ancient Chinese dynastic borders? in D.L. Peterson, L.M. Popova and A.T. Smith (eds) *Beyond the Steppe and the Sown. Proceedings of the 2002 University of Chicago Conference on Eurasian Archaeology* (Colloquia Pontica 13): 358–70. Leiden and Boston: E.J. Brill.

Linduff, K.M. 2010. 2010. Art, Death and the Interpretation of Mortuary Remains. *Art, Ritual Ceremony, Religion: Material Culture and Spiritual Beliefs (Chinese) Ancient Art and Primitive Worship. Artistica: Research Journal of Arts and Humanities:* 5–24

Linduff, K.M. and Mei Jianjun 2009. Metallurgy in ancient Eastern Asia: Retrospect and prospects. *Journal of World Prehistory* 22/3: 265–81.

Linduff, K.M. and Mei Jianjun 2014. Metallurgy in Ancient Eastern Asia: Retrospect and Prospects, in B.W. Roberts and C. Thornton (eds) *Archaeometallurgy in Global Perspective*: 785–803. New York: Springer.

Linduff, K.M. and Yang Jianhua 2012. Ritualization of Weapons in a Contact Zone: Between the past and the present, in C.W. Hartley and A.T. Smith (eds) *The Archaeology of Power and Politics in Eurasia: Regimes and revolutions*: 173 -87

Lipets, R.S. 1981. 'Litso volka blagoslovenno ...' (Stadial'nye izmeneniya obraza volka v tyurkomongol'skom epose i genealogicheskikh skazaniyakh). *Sovetskaya Etnografiya* 1981/1: 121–34.

Littauer, M.A. and J.H. Crouwel 1979. *Wheeled Vehicles and Ridden Animals in the Ancient Near East* (Handbuch der Orientalisk 7.1.2.B.1). Leiden: E.J. Brill.

Litvinsky, B.A. 1966. Slozhnosostavnoy luk v drevney Sredney Azii (k probleme evolyutsii luka na Vostoke). *Sovetskaya Arkheologiya* 1966/4: 51–69.

Litvinsky, B.A. 1972. O semantike dvukh izobrazitelnykh motivov pamirskogo 'zverinogo stilya', in *Tezisy dokladov III Vsesoyuznoy konferentsii po voprosam skifo-sarmatskoy arkheologii*: 144–48. Moscow: Institute of Archaeology, Soviet Academy of Sciences.

Litvinsky, B.A. 2001. The Bactrian Ivory Plate with a Hunting Scene from the Temple of Oxus. *Silk Road Art and Archaeology* 7: 137–65.

Litvinsky, B.A. and V.S. Soloviev 1985. *Kafyrkala. Frühmittelalterliche Stadt im Vachš-Tal, Süd-Tadžikistan*

(Materialien zur Allgemeinen und Vergleichenden Archäologie 28). Munich: C.H. Beck.

Liu Dezhen and Xu Junchen 1988. Gansu Qingyang Chunqiu Zhanguo muzang de qingli [Excavation of a tomb from the Spring and Autumn and the Warring States periods in Qingyang Gansu Province]. *Kaogu* 5: 413–24.

Liu Han 1959. Beichao de kaima qiyong [Funerary statuettes of the Northern dynasties – horsemen and horses in armour]. *Kaogu* 2: 97–100.

Liu Huaijun and Yan Huichan 2003. Shaanxi Mei Xian Qin Han Chengshangong yizhi de xin faxian [The newly discovered site of Chengshan Palace of the Qin and Han dynasties at Mei County, Shaanxi]. *Wenbo* 1: 3–7, 58.

Liu, S., Q.H. Li, F. Gan, P. Zhang and J.W. Lankton 2012. Silk Road glass in Xinjiang, China: chemical compositional analysis and interpretation using a high-resolution portable XRF spectrometer. *Journal of Archaeological Science* 39: 2128–42.

Liu Yunghua 2002. *Zhongguo gudai cheyu maju* [*Ancient Chinese chariots and equestrian equipment*]. Shanghai: Shanghai cishu chubanshe.

Liu Yuyang and Wang Hui 2017. Xian Qin shiqi xibei youmu diqu dongwu maizang xisu – cong maizang touti de xianxiang tanqi [Animal sacrifices in the northwestern region during the pre-Qin period: Beginning with the phenomenon of buried heads and hooves]. *Kaogu yu wenwu* 1: 62–69.

Liu Xinru. 2010. *The Silk Road in World History*. New York: Oxford University Press.

Livshits, V.A. 2003. Three Silver Bowls from the Isakovka Burial Ground N°1 with Khwarezmian and Parthian Inscriptions. *Ancient Civilizations from Scythia to Siberia* 9/1–2: 147–72.

Llewellyn-Jones, L. 2013. *King and Court in Ancient Persia 559–331 BCE*. Edinburgh: Edinburgh University Press.

Llewellyn-Jones, L. 2015. 'That My Body is Strong': the Physique and Appearance of the Achaemenid Monarch', in F. Wascheck and A. Shapiro (eds) *Fluide Körper-Bodies in Transition*: 211–48. Cologne: Wilhelm Fink.

Loehr, M. 1949. Ordos daggers and knives. New material, classification and chronology. First part: daggers. *Artibus Asiae* 12/1–2: 23–83.

Lokhov, K.I., N.G. Berezhnaya, D.I. Matukov, N.A. Bokovenko, G.I. Zaytseva, K.V. Chugunov and E.M. Skott 2007. Izotopnyy sostav strontsiya v kostyakh iz drevnikh zakhoroneniy Sayano-Altaya kak indikator mesta prozhivaniya i migratsii, in G.I. Zaytseva and M.A. Kulkova (eds) *Radiouglerod v arkheologicheskikh i paleoekologicheskikh*: 263–73. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Sciences.

Lombard, P. and N. Basmati-Fatah 2012. *Tilos. Puteshestvie v zagrobnyi mir. Ritualy i pogrebalnye traditsii v Bahraine v I v. do n.e. – III vv. n.e.* St. Petersburg: State Hermitage Museum.

Losev, A.F. 1976. *Problema simvola i realisticheskoye iskusstvo*. Moscow: 'Artiya'.

Losty, J. and M. Roy 2012. *Mughal India. Art, Culture and Empire*. London: British Library.

Lubo-Lesnichenko, E.I. 1961. *Drevniye kitayskiye shyolkovye tkany i vyshivki V v. do n.e. — III v. n.e. v sobranii gosudarstvennogo Ermitazha. Katalog*. Leningrad: State Hermitage Museum.

Lubo-Lesnichenko, E.I. 1994. *Kitay na Shyolkovom puti (Shyolk i vneshniye svyazi drevnego i rannesrednevekovogo Kitaya)*. Moscow: 'Oriental Literature', Russian Academy of Sciences.

Lubotsky, A. 1998. Avestan *xᵛarənah*: the etymology and concept, in W. Meid (ed.) *Sprache und Kultur. Akten der X. Fachtagung der Indogermanischen Gesellschaft, Innsbruck, 22–28 September 1996* (Innsbrucker Beiträge zur Sprachwissenschaft 93): 479–88. Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck.

Luczanits, C., ed. 2008. *Gandhara. The Buddhist Heritage of Pakistan. Legends, Monasteries, and Paradise. Catalogue of an exhibition held at the Art and Exhibition Hall of the Federal Republic of Germany, Bonn (21 November 2008–15 March 2009), the Martin-Gropius-Bau, Berlin (9 April–10 August 2009) and the Rietberg Museum, Zürich (6 September 2009–3 January 2010)*. Mainz am Rhein: Philipp von Zabern.

Lüders, H. 1961. *Mathurā Inscriptions: unpublished papers* (edited by K.L. Janert). Göttingen: Vandenhoeck and Ruprecht.

Ludwig, A., M. Pruvost, M. Reissmann, N. Benecke, G.A. Brockmann, P. Castaños, M. Cieslak, S. Lippold, L. Llorente, A-S. Malaspinas, M. Slatkin and M. Hofreiter 2009. Coat Color Variation at the Beginning of Horse Domestication. *Science* 324 (5926): 485.

Luke, B. 2017. Steppe right up for this golden show. *Evening Standard* 14th September: 44–45.

Lukpanova, Ya. 2008. Zverinyy stil na predmetakh konskogo snaryazheniya mogilnika Kyryk-oba II. *Voprosy istorii i arkheologii Zapadnogo Kazakhstana* 8: 245–53.

Lukpanova, Ya. 2014*a*. Komplekty konskogo snaryazheniya kurgana № 6 kompleksa Taksay 1 (predvaritel'nyy obzor), in A. Ongar (ed.) *Vsadniki Velikoy stepi: traditsii i novatsii*: 149–60. Astana: Filial of the Institute of Archaeology named after A.H. Margulan Press.

Lukpanova, Ya. 2014*b*. Kostyum zhenshchiny sarmatskoy epokhi: opyt rekonstruktsii, in M.K. Khabdulina (ed.) *Dialog kultur Evrazii v arkheologii Kazakhstana. Sbornik nauchnykh statey, posvyashchennyy 90-letiyu so dnya rozhdeniya K.A. Akisheva*: 430–40. Astana: Saryarka.

Lukpanova, Ya. 2015. Znakovvaja funkcija predmetov s zoomorfnymi izobrazhenijami iz kurgana n°6 kompleksa Taksaj-1 (Stepnoe Priural'e), in A.Z. Beisenov (ed.) *Sakskaya kultura Saryarki v kontekste izucheniya etnosotsiokulturnyh protsessov Stepnoy Evrazii*: 154–59. Almaty: Begazi-Tasmola.

Lukpanova, Ya. 2017. Rekonstruktsiya zhenskogo kostyuma iz elitnogo pogrebeniya Taksay-1: vzglyad arkheologa. *Volga archaeology* 1 (19): 145–56.

Lukpanova, Ya. 2018. Kompleks ritualnyh predmetov iz elitnogo zhenskogo zahoroneniya v Zapadnom Kazakhstane. *Samara Journal of Science* 7/4 (25): 228–32.

Lukyashko, S.I. 2000. K rekonstruktsii sobytiy konca IV – nachala III v. do n.e. na Nizhnem Donu, in *Skify i sarmaty v VII–III vv. do n.je. Paleoyekologiya, antropologiya i arkheologiya*: 167–80. Moscow: OOO 'Staryj sad'.

Luneau, É. 2017. Transfers and interactions between north and south in Central Asia during the Bronze Age, in E. Allinger, F. Grenet, C. Jahoda, M.-K. Lang and A. Vergati (eds) *Interaction in the Himalayas and Central Asia. Processes of transfer, translation and transformation in art, archaeology, religion and polity. Proceedings of the Third International SEECHAC Colloquium, 25–27 November 2013, Austrian Academy of Sciences* (Denkschriften der Philosophisch-Historischen Klasse Ser. 495): 13–27. Vienna: Austrian Academy of Sciences.

Luoyang Shi Di'er Wenwu Gongzuodui 2000. Luoyang Chundulu xi Jin mu fajue jianbao [Excavation of a Jin Dynasty Tomb in Luoyang]. *Wenwu* 10: 26–34.

Luschey, H. 2002. *Rechts und Links. Untersuchungen über Bewegungsrichtung, Seitenordnung und Höhenordnung als Elemente der antiken Bildsprache*. Tübingen: Wasmuth.

Luther, A. 1997. *Die syrische Chronik des Josua Stylites*. Berlin: Walter de Gruyter.

Lyonnet, B. 1991. Les nomades et la chute du royaume gréco-bactrien. Quelques nouveaux indices en provenance de l'Asie centrale orientale. Vers l'identification des Tokhares-Yueh-chi?, in P. Bernard and F. Grenet (eds) *Historie et cultes de l'Asie centrale pré-islamique. Sources écrites et documents archéologiques. Actes du Colloque international du CNRS (Paris, 22–28 novembre 1988)*: 153–61, pls 61–63. Paris: Centre National de la Recherche Scientifique.

Lyonnet, B. 2013. La céramique de la maison du quartier sud-ouest d'Aï Khanoum, in G. Lecuyot (ed.) *Fouilles d'Aï Khanoum IX, L'habitat* (Mémoires de la Délégation Archéologique Française en Afghanistan 34): 179–91, figs 82–122, pls XLIV–LI. Paris: de Boccard.

McAlister, W.H. and T.E. Herman 1995. Osteochondrodysplasias, dysostoses, chromosomal aberrations, mucopolysaccharidoses, and mucolipidoses, in D. Resnick (ed.) *Diagnosis of Bone and Joint Disorders*: vol. 6, 4163–244. London: W.B. Saunders (third edition).

McCall, H. 2018. Assyrian Revival, in G. Brereton (ed.) *I am Ashurbanipal, king of the world, king of Assyria*: 300–11. London: Thames and Hudson.

Macaulay, G.C. 1890. *The History of Herodotus. English translation by G.C. Macaulay*. London and New York: Macmillan.

Machinsky, D.A. 1997. Unikalny sacralny tsentr III – serediny I tys. do n.e. v Khakassko-Minusinskoy kotlovina, in D.G. Savinov and M.L. Podolsky (eds) *Okunevsky sbornik. Kultura. Iskusstvo. Antropologiya*: 265–87. St. Petersburg: Petro Rif.

Mackay, D. 1937. Bead Making in Ancient Sind. *Journal of the American Oriental Society* 57/1: 1–15.

Mackay, D. 1944. Beads from Taxila. *Antiquity* 18/72 (December): 201–204.

Mackay, E. 1929. *A Sumerian Palace and the 'A' Cemetery at Kish, Mesopotamia, Part II* (Anthropology Memoirs vol. I/2). Chicago: Field Museum of Natural History.

Mackay, E. 1931. Further links between Ancient Sind, Sumer and elsewhere. *Antiquity* 5/4 (December): 459–73.

Mackay, E. 1933. India: technology, decorated carnelian beads. *Man* 33/150 (September): 143–46.

Mackay, E. 1934. *Further Excavations at Mohenjodaro*. London: G. Bell and Sons (two volumes).

Mackay, E. 1943. *Chanhu-daro Excavations 1935–36* (American Oriental Series 20). New Haven: American Oriental Society.

MacKay, J. 2016. The Nomadic Other. Ontological Security and the Inner Asian Steppe in historical East Asian international politics. *Review of International Studies* 42/3: 471–91.

MacKay, J., J. Levin, G. de Carvalho, K. Cavoukian and R. Cuthbert 2014. Before and After Borders. The Nomadic Challenge to Sovereign Territoriality. *International Politics* 51/1: 101–23.

MacKie, L.W. 2015. *Symbols of Power: Luxury Textiles from Islamic Lands*. New Haven: Yale University Press.

Maenchen-Helfen, O.J. 1973. *The World of the Huns: Studies in Their History and Culture*. ed. by Max Knight, Berkeley: University of California Press.

Magee, P. 2015. When was the dromedary domesticated in the ancient Near East? *Zeitschrift für Orient-Archaeology* 8: 252–77.

Maggi, M. 2009. Khotanese literature, in R.E. Emmerick and M. Macuch (eds) *The Literature of Pre-Islamic Iran. Companion Volume I to a History of Persian Literature*: 330–417. London: I.B. Tauris.

Mahmoud Hussein, M. 2016. *Nimrud. The Queens' Tombs*. Baghdad and Chicago: Iraqi State Board of Antiquities and Heritage and The Oriental Institute, University of Chicago.

Mair, V.H. and P.O. Skjærvø 1992. Chinese Turkestan, ii: in pre-Islamic times, in E. Yarshater (ed.) *Encyclopaedia Iranica* 5: 463–69. Costa Mesa: Mazda.

Maitlan, M. 2017. Scythians: warriors of ancient Siberia. *Kensington, Chelsea and Westminster Today* (October): 38.

Majumdar, N.G. 1934. *Explorations in Sind. Being a report of the exploratory survey carried out during the years 1927–28, 1929–30 and 1930–31* (Memoirs of the Archaeological Survey of India 48). Delhi: Manager of Publications [sic].

Makhortykh, S.V. 1987. Novye dannye o skifo-kavkazskikh kontaktakh, in E.V. Chernenko (ed.) *Skify Severnogo Prichernomorya*: 53–62. Kiev: 'Naukova Dumka'.

Makhortykh, S.V. 2013. Pogrebal'nyye sooruzheniya i obryad Kurgannyy nekropol' Bel'skogo gorodishcha. *Stratum plus* 2013/3: 223–56.

Makhortykh, S. and R. Rolle 2011. Voinskie pogrebeniya na nekropolyah Belskogo gorodischa, in V.I. Molodin and S. Hansen (eds) *'Terra Scythica'. Materialy mezhdunarodnogo simpoziuma 'Terra Scythica' (17–23 avgusta 2011 g., Denisova peshchera, Gornyj Altaj)*: 149–54. Novosirbirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Malandra, W.W. 1983. *An Introduction to Ancient Iranian Religion. Readings from the Avesta and Achaemenid Inscriptions.* Minneapolis: University of Minnesota Press.

Malcolm, R. 1976. Method and importance of obtaining humic and fulvic acids of high purity. *Journal of Research of the United States Geological Survey* 4/1: 37–40.

Mallory, J.P. and D.Q. Adams 2006. *The Oxford Introduction to Proto-Indo-European and the Proto-Indo-European World*. Oxford: Oxford University Press.

Mallory, J.P. and V.H. Mair 2008. *The Tarim Mummies: ancient China and the mystery of the earliest peoples from the West*. London: Thames and Hudson (new edition).

Mallowan, M.E.L. 1966. *Nimrud and its Remains*. London: Collins (two volumes).

Manassero, N. 2013. Tamgas, a Code of the Steppes. Identity Marks and Writing among the Ancient Iranians. *The Silk Road* 11: 60–69.

Mandelshtam, A.M. 1966. *Kochevniki na puti v India* (Materialy i Issledovaniya po Arkheologii SSSR [MIA] 136 = Trudy Tadjikskoi Arkheologicheskoi Ekspeditsii Instituta Arkheologii an SSSR i Instituta Istorii im. A. Donisha an Tadjikskoi SSR 5). Moscow: Soviet Academy of Sciences.

Mandelshtam, A.M. 1983. Issledovaniye na mogilnom polye Aymyrlyg: nekotoriye itovi i perspektii, in V.M. Masson (ed.) *Drevniye Kulturi Euraziiskih Stepei (po materialam arkheologicheskih rabot na novostroykah)*: 25–33. Leningrad: Russian Academy of Sciences.

Mandelshtam, A.M. 1992. Ranniye kochevniki Skifskova perioda na territorii Tuvi, in M.G. Moshkova (ed.) *Stepnaya Polosa Aziatskoi Chasti SSSR v Skifo-Sarmatskoye Vremya* (Archeologiya SSSR): 178–96. Moscow: Russian Academy of Sciences.

Măndescu, D. 2010. *Cronologia perioadei timpurii a celei de-a doua epoci a fierului (sec. V-III a.Chr.) între Carpați, Nistru și Balcani.* Brăila: Istros.

Mannai-Ool, M.H. 1970. *Tuva v Skifskoye Vremya (Uyukskaya Kultura)*. Moscow: Russian Academy of Sciences.

Mantsevich, A.P. 1958. Golovka byka iz kurgana VI v. do n.e. na r. Kalitve. *Sovetskaya Arkheologiya* 1958/2: 196–202.

Manz, B.F. 1999. *The Rise and Rule of Tamerlane*. Cambridge: Cambridge University Press.

Marazov, I., D.V. Zhuravlev and K.B. Firsov (eds) 2013. *Frakijskoe zoloto iz Bolgarii. Ozhivshie legendy*. Moscow: 'Kuchkovo Polye'.

Marchenko, I.I. 1996. *Sirak Kubani (po materialam kurgannyh pogrebeniy nizhney Kubani)*. Krasnodar: Kuban University.

Marchenko, K. and Y. Vinogradov 1989. The Scythian period in the northern Black Sea region (750–250 BC). *Antiquity* 63: 803–13.

Marchenko, K.K., V.G. Zhitnikov and V.P. Kopylov 2000. *Elizavetovskoe gorodishche na Donu*. Moscow: Paleograph.

Marsadolov, L.S. 1989*a*. Kurgan Arzhan. Khronologiya, altayskiye i evropeyskiye analogii, in Yu.G. Vinogradov (ed.) *Problemy skifo-sarmatskoy arkheologii severnogo Prichernomorya. Tezisy dokladov oblastnoy konferentsii k 90-letiyu so dnya rozhdeniya professora B.N. Grakova*: 81–82. Zaporozhye: Zaporozhye State University Press.

Marsadolov, L.S. 1989*b*. K voprosu o semantike kurgana Arzhan, in V.N. Dobzhansky (ed.) *Problemy arkheologii skifo-sibirskogo mira (sotsialnaya structura i obshchestvennye otnosheniya) Tezisy Vsesoyuznoy arkheologicheskoy konferentsii*: Part 2, 33–35. Kemerovo: Kemerovo State University Press.

Marsadolov, L.S. 1994. Early Bronze Age Art of Southern Siberia, in M.B. Piotrovsky (ed.) *Great Art Treasures of the Hermitage Museum. St. Petersburg*: vol. 1, 54–57. London and New York: Harry N. Abrams.

Marsadolov, L.S. 2000. New Semantics of the Arzhan Barrow, in anon. (ed.) *6th Annual Meeting of the European Association of Archaeologists. Final Programme and Abstracts*: 82–83. Lisbon: European Association of Archaeologists Publications.

Marsadolov, L.S. 2005. 'Olennye' kamni iz posyolka Arzhan v Tsentre Azii, in V.I. Guliaev (ed.) *Drevnosti Evrazii: ot ranney bronzy do rannego srednevekovya. Pamyati V.S. Olkhovskogo. Sbornik statey*: 301–11. Moscow: Institute of Archaeology, Russian Academy of Sciences.

Marsadolov, L.S. 2007. Otchet ob issledovanii drevnikh svyatilishch Altaya v 2003–2005 godakh, in M.B. Piotrovsky (ed.) *Materialy Sayano-Altayskoy arkheologicheskoy ekspeditsii gosudarstvennogo Ermitazha*: 278. St. Petersburg: State Hermitage Museum.

Marsadolov, L.S. 2009. Kurgan Arzhan-1 v Tsentre Azii (geopoliticheskiy i astronomicheskiy aspekty), in V. Chigzhit (ed.) *Naslediye narodov Tsentralnoy Azii i sopredelnykh territoriy: izucheniye, sokhraneniye i ispolzovaniye. Materialy Mezhdunarodnoy nauchno-prakticheskoy conferentsii*: part I, 59–63. Kyzyl: Anyyak.

Marsadolov, L.S. 2010. *Bolshoy Salbyksky kurgan v Khakasii*. Abakan: Khakasia Press.

Marsadolov, L.S. 2012. Drevnyaya Mongoliya na Velikom Stepnom Puti Evrazii v IX–VII vekakh do n.e., in D. Tumen (ed.) *Drevniye kultury Mongolii i Baykalskoy Sibiri. Vyp. 3. Materialy III Mezhdunarodnoy nauchnoy konferentsii*: vol. I, 203–12. Ulan Bator: Mongolia State University Press.

Marsadolov, L.S. 2014. 1200-letnyaya periodichnost poyavleniya 'voln' kamennykh izvayaniy v Yuzhnoy Sibiri i sovremmenye problemy ikh izucheniya, in A.A. Tishkin (ed.) *Drevniye i srednevekovye izvayaniya Tsentralnoy Azii. Sbornik statey*: 68–75. Barnaul: Altai State University Press.

Marsadolov, L.S. 2015. Arkheologicheskaya data bolshogo Berelskogo kurgana (k 150-letiyu nachala issledovaniya), in A.B. Kalysh (ed.) *Materialy mezhdunarodnoy nauchno-prakticheskoy konferentsii 'VII Orazbaevskie chteniya'*: 55–60. Almaty: Kazakh University Press.

Marsadolov, L.S. 2017. The 'Deer' Stone, in St J. Simpson and S. Pankova (eds) *Scythians: warriors of ancient Siberia*: 82–83. London: Thames and Hudson.

Marsadolov, L.S. and N.V. Tsarev 2000. Tkani iz kurgana Arzhan v Tsentre Azii, in V.I. Matiushchenko (ed.) *Pyatye istoricheskie chteniya pamyati M.P. Gryaznov*: 72–75. Omsk: Omsk State University Press.

Marsadolov, L.S., G.I. Zaitseva and L.M. Lebedeva 1994. Korrelyatsiya dendrokhronologicheskikh i radiouglerodnykh opredeleniy dlya bolshikh kurganov Sayano-Altaya, in A.Iu. Alekseev, N.A. Bokovenko, L.S. Marsadolov and V.A. Sevenov (eds) *Elitnye kurgany stepey Evrazii v skifo-sarmatskuyu epokhu. Materialy zasedaniy 'kruglovo stola'. 22–24 dekabrya 1994 goda*: 141–56. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Sciences.

Marsadolov, L.S., E.A. Mikolaychuk, L.S. Gavrilenko and S.V. Pankova 2017. Novye issledovaniya tkaney iz kurgana Arzhan-1 v Tuve. *Teoriya i praktika arkheologicheskikh issledovaniy* 19/3: 119–49. Barnaul: Altai State University Press.

Marshak, B.I. 1986. *Silberschätze des Orients. Metallkunst des 3.–13. Jahrhunderts und ihre Kontinuität*. Leipzig: Seemann (translated from the Russian by L. Schirmer).

Marshak, B.I. and J.K. Krikis 1969. Čilekskie čaši. *Trudy gosudarstvennogo Ermitazha* 7: 55–80.

Marshall, F.H. 1911. *Catalogue of the Jewellery, Greek, Etruscan and Roman in the departments of Antiquities, British Museum*. London: The British Museum.

Marshall, Sir John 1951. *Taxila. An illustrated account of archaeological excavations carried out at Taxila under the orders of the Government of India between the years 1913 and 1934*. Cambridge: Cambridge University Press (three volumes).

Martynov, A.I. 1984. O mirovozzrencheskoy i ideynoy osnovakh iskusstva skifo-sibirskogo mira, in A.I. Martynov (ed.) *Skifo-sibirskiy mir (iskusstvo i ideologiya)*: 3–7. Kemerovo: Russian Academy of Sciences.

Marx, E. 1967. *Bedouin of the Negev*. Manchester: Manchester University Press.

Maslennikov, A.A. 1998. *Ellinskaya khora na krayu Ojkumeny. Selskaya territoriya evropeyskogo Bospora v antichnuyu epokhu*. Moscow: 'Indrik'.

Maslov, V.E. 2012. K probleme khronologii drevnostey kelermesskogo gorizonta. *Rossiysky arkheologichesky ezhegodnik 2*: 342–59. St. Petersburg: University Press.

Masson, V.M. 1988. Scythians and their culture, in B. Piotrovsky and G. Bongard-Levin (eds) *Ancient Civilisations of East and West*: 102–12. Moscow: Progress Publishers (translated by S. Syrovatkin).

Masson, V. and T. Taylor 1989. Soviet Archaeology in the Steppe Zone. Introduction. *Antiquity* 63/241: 779–83.

Mauss, M. 2002. *The Gift. The Form and Reason for Exchange in Archaic Societies*. London and New York: W.W. Norton and Co. (translated by W.D. Halls).

Maximenkov, G.A. 1980. Mogilnik Chernovaya VIII – etalonny pamyatnik okunevskoy kultury, in M.P. Gryaznov, E.B. Vadetskaya, N.V. Leontiev and G.A. Maximenkov (eds) *Pamyatniki okunevskoy kultury*: 3–26. Leningrad: Russian Academy of Sciences.

Maxwell-Hyslop, K.P. 1971. *Western Asiatic Jewellery c. 3000–612 B.C.* London: Methuen.

Mead, S.M. 1952. *Taniko weaving (how to make Maori belts and other useful articles)*. Wellington: Write and Carman Ltd.

Medvedskaya, I.N. 1992. Periodizatsiya skifskoy arkhaiki i Drevny Vostok. *Rossiyskaya Arkheologiya* 1992/3: 86–107.

Meeks, N. and M.S. Tite 1980. The analysis of platinum group element inclusions in gold antiquities. *Journal of Archaeological Science* 7: 267–75.

Meeks, N., A. Mongiatti and J. Joy 2014. Precious metal torcs from the Iron Age Snettisham Treasure: metallurgy and analysis, in E. Pernicka and R. Schwab (eds) *Under the Volcano. Proceedings of the International Symposium on the Metallurgy of the European Iron Age (SMEIA) held in Mannheim, Germany, 20–22 September 2010*: 135–56. Rahden: Marie Leidorf.

Meletinsky, Ye.M. (ed.) 1990. *Mifologicheskiy slovar*. Moscow: Soviet Encyclopaedia.

Melikian-Chirvani, A.S. 1998 [2001]. Rostam and Herakles, a family resemblance. *Bulletin of the Asia Institute* 12 [Alexander's Legacy in the East: studies in honor of Paul Bernard]: 171–99.

Melyukova, A.I. 1962. *Skifskie kurgany Tiraspolschiny (po materialam I.Ya. i L.P. Stempkovskih)* (Materialy i Issledovaniya po Arkheologii SSSR = MIA 115). Moscow and Leningrad: Russian Academy of Sciences.

Melyukova, A.I. 1964. *Vooruzhenie skifov*. Moscow: Russian Academy of Sciences.

Melyukova, A.I. 1969. K voprosu o granitse mezhdu skifami i getami, in T.D. Zlatkovskaya and A.I. Melyukova (eds) *Drevniye frakiytsy v Severnom Prichernomorye* (Materialy i Issledovaniya po Arkheologii SSSR = MIA) 150: 61–80. Moscow: Russian Academy of Sciences.

Melyukova, A.I. 1979. *Skifiya i frakiyskiy mir*. Moscow: Russian Academy of Sciences.

Melyukova, A.I. 1981. *Krasnokutskiy kurgan.* Moscow: Russian Academy of Sciences.

Melyukova, A.I. 1989*a*. Skifskoe iskusstvo zverinogo stilya, in B.A. Rybakov (ed.) *Stepi Evropeyskoy chasti SSSR v skifo-sarmatskoe vremya* (Arkheologiya SSSR): 100–104. Moscow: Russian Academy of Sciences.

Melyukova, A.I. 1989*b*. Skifskie pamyatniki stepi severnogo Prichernomorya, in A.I. Melyukova (ed.) *Stepi evropeiskoi chasti SSSR v skifo-sarmatskoe vremya*: 51–67. Moscow: Russian Academy of Sciences.

Melyukova, A.I. 1995. Scythians of southeastern Europe, in J. Davis-Kimball, V. Bashilov and L. Yablonsky (eds) *Nomads of the Eurasian steppes in the early Iron Age*: 27–62. Berkeley: Zinat Press.

Melzer, G. (with L. Sander) 2006. A Copper Scroll Inscription from the Time of the Alchon Huns, in *Manuscripts in the Schøyen Collection. Buddhist Manuscripts III*: 251–78. Oslo: Hermes.

Menshikova, M.L. 2011. Polikhromnaya tkan iz Noin-Uly s kompozitsiey so skalami, gribami i ptitsami. *Vozmozhnaya interpretatsiya. Soobshcheniya gosudarstvennogo Ermitazha* 69: 15–35.

Merpert, N.Ya. 1948. Akinak s kogtevidnym navershiem. *Kratkiye soobshcheniya Instituta Arkheologii* 22: 74–79.

Merrillees, P.H. 2005. *Pre-Achaemenid and Achaemenid Periods* (Catalogue of the Western Asiatic Seals in the British Museum, Cylinder Seals VI). London: The British Museum.

Meyer, C. 2013. *Greco-Scythian art and the birth of Eurasia*. Oxford: Oxford University Press.

Michaelson, C. 2004. Jade and the silk road: trade and tribute in the first millennium, in S. Whitfield and U. Sims-Williams (eds) *The Silk Road: trade, travel, war and faith*: 43–49. London: The British Library.

Michel, A. 2014. Skin deep: an outline of the structure of different skins and how it influences behaviour in use, in S. Harris and A.J. Veldmeijer (eds) *Why Leather? The material and cultural dimensions of leather*: 23–40. Leiden: Sidestone.

Michel, S. 1995. *Der Fisch in der skytischen Kunst. Zur Deutung skytischer Bildinhalte*. Frankfurt: Europäische Hochschulschriften Archäologie.

Miklashevich, E.A. 2004. 'Plemya edinoroga' na Enisee (syanbeyskiye motivy v naskalnom iskusstve Minusinskoy kotloviny), in D.G. Savinov (ed.) *Izobrazitelniye pamyatniki: stil, epokha, kompozitsii. Materialy tematicheskoy nauchnoy konferentsii*: 320–25. St. Petersburg: St Petersburg State University.

Miklashevich, E.A. 2008. Rock Art Research in Siberia and Central Asia 2000–2004, in P. Bahn (ed.) *Rock Art Studies: News of the World* III: 138–78. Oxford: Oxbow.

Miklashevich, E.A. 2015. Kompleks pamyatnikov naskal'nogo iskusstva Oglahty: informatsionnyj potentsial i perspektivy issledovanija. *Sajano-Altayskoe nauchnoe obozrenie. Arkheologiya* 1 (9): 54–77.

Miklashevich, E.A. 2016. Pamyatniki naskal'nogo iskusstva Oglahtinskogo hrebta: perspektivy nominirovanija v Spisok vsemirnogo nasledija UNESCO, in *Arkheologicheskoe nasledie Sibiri i Tsentralnoy Azii (problemy interpretatsii i sohranenija)*: 268–73. Kemerovo: Kuzbassvuzizdat.

Miklashevich, E.A. 2017. Novye materialy po naskalnomu iskusstvu skifskogo vremeni v gorah Oglakhty (Khakasiya). *Kratkie soobshhenija instituta arkheologii* 248: 185–97.

Miklashevich, E.A. and Yu.I. Ozheredov 2008. Fotografii sibirskih pisanits v nasledii A.V. Adrianova, in anon. (ed.) *Tropoyu tysyacheletiy. K jubileju M.A. Devlet* (Trudy Sibirskoy Assotsiatsii issledovatelei pervobytnogo iskusstva): vol. IV, 156–87. Kemerovo: Kuzbassvuzizdat.

Miller, A.A. 1910. Raskopki v rayone drevnego Tanaisa. *Izvestiya Imperatorskoy arkheologicheskoy komissii* 35: 86–130.

Miller, A.A. 1925. Novyi istochnik k izucheniyu svyazi Skifii s Kavkazom. *Izvestiya Rossiyskoy akademii istorii materialnoy kultury* 4: 96–114.

Miller, B.K. 2012. Vehicles of the Steppe Elite: Chariots and Carts in Xiongnu Tombs. *The Silk Road* 10: 29–38.

Miller, A.A. 2014. Xiongnu 'Kings' and the Political Order of the Steppe Empire. *Journal of the Economic and Social History of the Orient* 57/1: 1–43.

Miller, B.K., J. Bayarsaikhan, P.B. Konovalov, T. Egiimaa, J. Logan and M. Machicek 2009. Xiongnu constituents of the high mountains. Results of the Mongol–American Khovd archaeology project, 2008. *The Silk Road* 7: 8–20.

Miller, M.C. 1997. *Athens and Persia in the fifth century BC. A study in cultural receptivity*. Cambridge: Cambridge University Press.

Minardi, M. 2015. *Ancient Chorasmia: a polity between the semi-nomadic and sedentary cultural areas of Central Asia: cultural interactions and local developments from the sixth century BC to the first century AD*. Leuven: Peeters.

Minasyan, R.S. 1986. Litye bronzovykh kotlov u narodov stepey Evrazii. *Arkheologichesky Sbornik gosudarstvennogo Ermitazha* 27: 61–78.

Minasyan, R.S. 2004. Sekrety skifskih yuvelirov, in O.A. Fedoseenko (ed.) *Arzhan. Istochnik v Doline Tsarej. Arkheologicheskie otkrytiya v Tuve*: 40–45. St. Petersburg: Slavia.

Minasyan, R.S. 2010. Matritsa-'former'. *Arkheologichesky sbornik gosudarstvennogo Ermitazha* 38: 180–95.

Minasyan, R.S. 2014. *Metalloobrabotka v drevnosti i srednevekovye (vol. 1)*. St. Petersburg: State Hermitage Museum.

Minasyan, R.S. 2017. Gold plaques from the Siberian Collection of Peter the Great: manufacturing techniques, in St J. Simpson and S. Pankova (eds) *Scythians: warriors of ancient Siberia*: 68–69. London: Thames and Hudson.

Minasyan, R.S. in press. *Metalloobrabotka v drevnosti i srednevekovye (vol. 2)*. St. Petersburg: State Hermitage Museum.

Minasyan, R.S. and E.A. Shablavina 2009. O roli tekhnicheskoy terminologii v arkheologicheskoy literature, in A.G. Furasyev (ed.) *Gunny, goty i sarmaty mezhdu Volgoy i Dunayem*: 236–61. St. Petersburg: St. Petersburg University Press.

Ming, W. 2010. *Imperial Chinese Robes.* London: Batford Victoria and Albert Museum.

Minns, E.H. 1913. *Scythians and Greeks. A Survey of Ancient History and Archaeology on the North Coast of the Euxine from the Danube to the Caucasus.* Cambridge: Cambridge University Press.

Minyaev, S.S. 2009. Elitny kompleks syunnuskikh zakhoreneniy v padi Tsaram (Zabaikalye). *Arkheologiya, Etnografiya i Antropologiya Evrazii* 38 (2009/2): 49–58.

Minyaev, S.S. and E.V. Stepanova in press. Drevneyshiye sedla s lukami. *Arkheologicheskie vesti*. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Sciences.

Minzhulin, O.I. 1991. Rekonstruktsiya zakhysnoho ozbroyennya skifs'koho voyina z Hladkovshchyny. Zoloto stepu, in P.P. Tolochko and V.Yu. Murzin (eds) *Zoloto stepu. Arkheolohiya Ukrayiny*: 137–43. Kiev: Shlesvig.

Miyazaki, Ichisada (宮崎市定) 1977/78. 中国史 *Chūgoku-shi*. Tokyo: Iwanami (two volumes: second edition, 1993).

Mogilnikov, V.A. 1992. Sargatskaya kultura, in M.G. Moshkova (ed.) *Stepi Aziatskoy chasti SSSR v skifo-sarmatskoe vremia* (Arkheologiya SSSR) 10: 292–311. Moscow: Russian Academy of Sciences.

Mogilov, O.D. 2008. *Sporyadzhennya konya skifskoy dobi u lesostepu Shidnoy Evropy.* Kiev and Kamenets-Podolsky: Institute of Archaeology, National Academy of Sciences of Ukraine.

Molodin, V.I. and S. Hansen (eds) 2011. *'Terra Scythica'. Materialy mezhdunarodnogo simpoziuma 'Terra Scythica' (17–23 avgusta 2011 g., Denisova peshchera, Gorny Altay)*. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Molodin, V.I. and A.V. Epimakhov (eds) 2014. *Arii stepey Evrazii: epoha bronzy i rannego zheleza v stepyah Evrazii i na sopredelnyh territoriyah*. Barnaul: Altai State University Press.

Molodin, V.I., H. Parzinger and D. Tseveendorzh 2012. *Zamerzshiye pogrebalnyye kompleksy pazyrykskoy kultury na yuzhnykh sklonakh Saylyugema (Mongolskiy Altay)*. Moscow: Triumph Press.

Molodin, V.I., L.A. Prasolova, M.A. Potapov, V.I. Evsikov, H. Parzinger and D. Tseveendorzh 2009. Species Attribution of Hair of the Pazyryk Fur Coat from the Olon-Kurin-Gol-10 Burial Ground, Mongolia (Based on Morphometric Analysis). *Arkheologiya, Etnografiya i Antropologiya Evrazii* 37 (2009/2): 59–66.

Momigliano, A.D. 1994. M.I. Rostovtzeff, in G.W. Bowersock and T.J. Cornell (eds) *Studies on Modern Scholarship*: 32–43. Berkeley: University of California Press.

Monakhov, S.Yu. 1989. *Amfory Khersonesa Tavricheskogo IV–II vv. do n.e.* Saratov: University Publishing House.

Monakhov, S.Yu. 1993. K khronologii Aleksandropolskogo kurgana, in *Vtoraya Kubanskaya arkheologicheskaya konferentsiya. Tezisy dokladov*: 68–70. Krasnodar.

Monakhov, S.Yu. 1999. *Grecheskiye amfory v Prichernomorye. Kompleksy keramicheskoy tary VII–II vv. do n.e.*. Saratov: University Publishing House.

Monakhov, S.Yu. 2002. 'Pozdnie' serii gerakleyskih amfor (kontsa IV – pervoy treti III vv. do n.e.). *Antichnyy mir i arkheologiya* 11: 167–77.

Monakhov, S.Yu. 2003. *Grecheskiye amfory v Prichernomorye. Tipologiya amfor vedushchikh tsentrov-eksporterov tovarov v keramicheskoy tare. Katalog-opredelitel.* Moscow and Saratov: 'Kimmerida' and Saratov: University Publishing House.

Monakhov, S.Yu. 2006. O khronologii sarmatskogo pogrebeniya s gerakleyskoy amforoy iz Bashkirii. *Liber Archaeologicae*: 89–93. Krasnodar and Rostov-on-Don: Izdatelstvo YUNTs RAN.

Monakhov, S.Yu. 2013. Amfory Akanfa. Novye nahodki i zametki o specifike amfornogo proizvodstva v polis, in I.I. Marchenko (ed.) *Shestaya mezhdunarodnaya Kubanskaya arkheologicheskaya konferentsiya. Materialy konferentsii*: 294–300. Krasnodar: Ekoinvest.

Monakhov, S.Yu. 2014. Kosskie i psevdokosskie amfory i kleyma. *Stratum plus* 2014/3: 195–222.

Monakhov, S.Yu. 2016. Esche raz o gerakleyskih amforah s kleymami 'mnogostradalnogo' fabrikanta Etima. *Stratum plus* 2016/6: 357–70.

Monakhov, S.Yu. and N.F. Fedoseyev 2013. Zametki po lokalizatsii keramicheskoy tary. III: Amfory Ikosa. *Antichnyy mir i arkheologiya* 16: 255–66.

Monakhov, S.Yu. and E.V. Kuznetsova 2009. Ob odnoy serii amfor neustanovlennogo doriyskogo tsentra IV veka do n.e. (byvshiye 'bosporskiye' ili 'rannekhersonesskiye'), in V.P. Kopylov (ed.) *Sbornik materialov XII mezhdunarodnoy konferentsii 'Mezhdunarodnyye otnosheniya v basseyne Chernogo morya v drevnosti i sredniye veka'*: 148–61. Rostov–on–Don: Media-Polis.

Mongiatti, A. 2017. Scythian-style artefacts from the Oxus Treasure: manufacture and decoration, in St J. Simpson and S. Pankova (eds) *Scythians: warriors of ancient Siberia*: 311–13, cats 225–31. London: Thames and Hudson.

Mongiatti, A. 2018. Scythian gold under the microscope. *InFocus Magazine* 50: 4–19.

Mongiatti, A., N. Meeks and St J. Simpson 2010. A gold four-horse model from the Oxus Treasure: a fine illustration of Achaemenid goldwork. *The British Museum Technical Research Bulletin* 4: 27–38.

Moorey, P.R.S. 1980. *Cemeteries of the First Millennium B.C. at Deve Hüyük, near Carchemish, salvaged by T.E. Lawrence and C.L. Woolley in 1913 (with a catalogue raisonné of the objects in Berlin, Cambridge, Liverpool, London and Oxford)* (BAR International Series 87). Oxford: British Archaeological Reports.

Moorey, P.R.S. 1985. The Iranian Contribution to Achaemenid Material Culture. *Iran* 23: 21–37.

Moradi, Z. 2015. Fish imagery in Iranian artwork. *Iranian Society of Ichtyology* 2/4: 244–61.

Mordvintseva, V.I. 1996. O vtorichnom ispol'zovanii ahemenidskih bljud iz Prohorovskogo kurgana. *Rossiyskaya Arkheologiya* 1996/2: 155–59.

Mordvintseva, V.I. 1999. A typology of the Sarmatian phalerae: 3rd century BC–2nd century AD. *Acta Archaeologica* 70: 137–47.

Mordvintseva, V.I. 2001. *Sarmatische Phaleren* (Archäologie in Eurasien 11). Rahden: Marie Leidorf.

Mordvintseva, V.I. 2003. *Polyhromny zveriny stil*. Simferopol: Universum.

Mordvintseva, V.I. 2010. Tillya-tepe gold jewellery and its relations to the Sarmatian Animal Style of the Northern Black Sea. *Anabasis Studia Classica et Orientalia* 1: 175–207.

Morgunova, N.L. and L.A. Kraeva 2012. Kurgannaya gruppa Akoba II, in N.L. Morgunova (ed.) *Arkheologicheskiye pamyatniki Orenburzh'ya* 10: 156–99. Orenburg: OGPU Publishing House.

Morgunova, N.L., A.A. Golieva, L.A. Kraeva, D.V. Meshcheryakov, M.A. Turetskiy, M.V. Khalyapin and O.S. Khokhlova 2003. *Shumayevsky kurgan*. Orenburg: Orenburg State Pedagogical University.

Morris, G.B. 1978. *Frozen tombs: the culture and art of the ancient tribes of Siberia*. London: British Museum Publications.

Moshkova, M.G. 1963. Pamyatniki Prokhorovskoy kultury. *Svod arkheologicheskih istochnikov*: 1–10. Moscow: Russian Academy of Sciences.

Moshkova, M.G. 1974. *Proishozhdenie rannesarmatskoy Prokhorovskoy kultury*. Moscow: Russian Academy of Sciences.

Moshkova, M.G. and M. Treister 2014. Steklannyj kubok so scenoy poednika gladiatorov iz kochevnicheskogo pogrebeniya mogilnika Lebedevka V (Zapadnij Kazakhstan). *Rossiyskaya Arkheologiya* 2014/2: 108–19.

Motuzaite-Matuzeviciute, G., S. Telizhenko and M.K. Jones 2012. Archaeobotanical investigation of two Scythian-Sarmatian period pits in eastern Ukraine: implications for floodplain cereal cultivation. *Journal of Field Archaeology* 37/1: 51–61.

Mount, H. 2017. Warriors who drink their enemies' blood. *Daily Mail* 14th September: 17, 21.

Mozolevsky, B.N. 1979. *Tovsta Mogyla*. Kiev: 'Naukova Dumka'.

Mozolevsky, B.N. and S.V. Polin (eds) 2005. *Kurgany Skifskogo Gerrosa IV v. do n.e. (Babina, Bodyana i Soboleva mogily)*. Kiev: Stilos.

Mukhopad, S.Ye. 1989. Skifskiye pogrebeniya rayona Solonyano-Tomakovskoy orositel'noy sistemy, in *Problemy arkheologii Podneprovya*: 72–84. Dnepropetrovsk: Dnepropetrovsk State University Press.

Müller, H.-H. 1985. *Frühgeschichtliche Pferdeskelettfunde im Gebiet der Deutschen Demokratischen Republik* (Beiträge zur Archäozoologie IV). Weimar: Museum für Ur- und Frühgeschichte Thüringens.

Müller-Karpe, H. 1961. *Die Vollgriffschwerter der Urnenfelderzeit aus Bayern* (Münchner Beiträge zur Vor und Frühgeschichte 6). Munich: C.H. Beck.

Murphy, E.M. 1998. An Osteological and Palaeopathological study of the Scythian and Hunno-Sarmatian period Populations from the Cemetery Complex of Aymyrlyg, Tuva, South Siberia. Unpublished PhD dissertation, Queen's University Belfast.

Murphy, E.M. 2000*a*. Mummification and body processing – evidence from the Iron Age in Southern Siberia, in J. Davis-Kimball, E. Murphy, L. Koryakova and L. Yablonsky (eds) *Kurgans, Ritual Sites, and Settlements: The Eurasian Bronze and Iron Age* (BAR International Series 890): 279–92. Oxford: Archaeopress.

Murphy, E.M. 2000b. Developmental defects and disability: the evidence from the Iron Age semi-nomadic peoples of Aymyrlyg, south Siberia, in J. Hubert (ed.) *Madness, Disability and Social Exclusion* (One World Archaeology 40): 60–80. London: Routledge.

Murphy, E.M. 2003*a*. *Iron Age Archaeology and Trauma from Aymyrlyg, South Siberia* (BAR International Series 1152). Oxford: Archaeopress.

Murphy, E.M. 2003*b*. Trepanations and perforated crania from Iron Age South Siberia: an exercise in differential diagnosis, in R. Arnott, S. Finger and C.U.M. Smith (eds) *Trepanation: History, Discovery, Theory*: 209–21. Lisse and Exton (PA): Swets and Zeitlinger.

Murphy, E.M. 2004. Herodotus and the Amazons meet the Cyclops: philology, osteoarchaeology and the Eurasian Iron Age, in E. Sauer (ed.) *Breaking Down Boundaries: The Archaeology – Ancient History Divide*: 169–84. London: Routledge.

Murphy, E.M. 2008. A biocultural study of children from Iron Age south Siberia, in K. Bacvarov (ed.) *Babies Reborn: Infant/Child Burials in Pre- and Proto-history* (BAR International Series 1832): 175–87. Oxford: Archaeopress.

Murphy, E.M. 2012. A bioarchaeological study of Xiongnu expansion in Iron Age Tuva, South Siberia, in C.W. Hartley, G.B. Yazicioğlu and A.T. Smith (eds) *The Archaeology of Power and Politics in*

Eurasian: Regimes and revolution: 240–61. Cambridge: Cambridge University Press.

Murphy, E.M. and J. Davis-Kimball 2001. Weapon trauma on Bronze Age human skeletal remains from the Chowhougou cemeteries. *Journal of Palaeopathology* 13: 27–34.

Murphy, E.M. and A. Khokhlov 2016. Biocultural analysis of the prehistoric populations of the Volga region, in D. Anthony, D. Brown, A. Khokhlov, P. Kuznetsov and O. Mochalov (eds) *The Samara Valley Project: A Bronze Age Landscape in the Russian Steppes* (Monumenta Archaeologica 37): 147–214. Los Angeles: UCLA Cotsen Institute of Archaeology Press.

Murphy, E.M. and J.P. Mallory 2000. Herodotus and the cannibals. *Antiquity* 74: 388–94.

Murphy, E.M., U.M. Donnelly and G.E. Rose 1998. Possible neurofibromatosis in an individual of the Scythian period from Tuva, South Siberia. *International Journal of Osteoarchaeology* 8: 424–30.

Murphy, E.M., I.I. Gokhman, Y.K. Chistov and L.L. Barkova 2002. A review of the evidence for Old World scalping: new cases from the cemetery of Aymyrlyg, South Siberia. *American Journal of Archaeology* 106: 1–10.

Murphy E.M., Y.K. Chistov, R. Hopkins, P. Rutland and G.M. Taylor 2009. Tuberculosis among Iron Age individuals from Tyva, South Siberia: palaeopathological and biomolecular findings. *Journal of Archaeological Science* 36: 2029–38.

Murphy, E.M., R.J. Schulting, N. Beer, Y. Chistov, A. Kasparov and M. Pshenitsyna 2013. Iron Age pastoral nomadism and agriculture in the eastern Eurasian steppe: implications from dental palaeopathology and stable carbon and nitrogen isotopes. *Journal of Archaeological Science* 40: 2547–60.

Muscarella, O.W. 1988. *Bronze and Iron. Ancient Near Eastern Artifacts in the Metropolitan Museum of Art*. New York: Metropolitan Museum of Art.

Musil, A. 1928. *The Manners and Customs of the Rwala Bedouins*. New York: American Geographical Society.

Myglan, V.O., I.Yu. Slyusarenko, O.Ch. Oydupaa and Yu.N. Garkusha 2006. Tsarskiy kurgan Arzhan-2 v Tuve: dendrokhronologicheskiy aspect. *Arkheologiya, Etnografiya i Antropologiya Evrazii* 28 (2006/4): 130–38.

Myngbay, D.K., A. Onggaruly, Zh.K. Taimagambetov, Zh. Beysenbaiuli, A.K. Satubaldin and R.I. Bektaliyeva 2016. *Gold of Ages – Collection of gold and silver of the National Museum. The Illustrated Catalogue* (Kazyna Series 3). Astana: National Museum of the Republic of Kazakhstan.

Myshkin, V.N. 2013. Tipy pogrebalnogo obryada sotsialnoy elity kochevnikov Samaro-Uralskogo regiona v VI–V vv. do n.e. *Izvestiya Samarskogo nauchnogo tsentra Rossiyskoy Akademii nauk* 15/1: 219–25.

Nagler, A. 2013. Pogrebalnyye sooruzheniya rannego zheleznogo veka stepey Evrazii. *Nauchnoye obozreniye Sayano-Altaya* 5/1: 222–32.

Nagler, A., Z. Samashev, H. Parzinger and M. Nawroth 2010. Süd-Kasachstan: Kurgane Asy Saga, Kegen und Žoan Tobe, in N. Boroffka and S. Hansen (eds) *Archäologische Forschungen in Kasachstan, Tadschikistan, Turkmenistan und Usbekistan*: 49–54. Berlin: Deutsches Archäologisches Institut, Eurasien Abteilung.

Naji, A.J. and Y.N. Ali 1981. The Suqs of Basrah: Commercial Organization and activity in a Medieval Islamic city. *Journal of the Economic and Social History of the Orient* 24: 298–309.

Narain, A.K. 1987. The Sakā Haumavargā and the Amyrgioi: The Problem of Their Identity. *Bulletin of the Asia Institute* (N.S.) 1: 27–31.

Narain, A.K. 1990. Indo-Europeans in inner Asia, in D. Sinor (ed.) *The Cambridge History of Early Inner Asia: from earliest times to the rise of the Mongols*: 151–76. Cambridge: Cambridge University Press.

Narain, A.K. 1998. *The Earliest Sakas of South Asia*. Patna: K.P. Jayaswal Research Institute.

Narain, A.K. 2013. South Asia, central Asia and south Russia: the Saka connection, in D.N. Tripathi, R.C. Agrawal and P.K. Shukla (eds) *India, Central Asia and Russia: three millennia of contacts*: 30–45. New Delhi: ICHR-Aryan Books International.

Nattier, J. 2004. Central Asia, in R. Buswell, Jr. (ed.) *Encyclopaedia of Buddhism* 1: 120–22. New York: MacMillan.

Naveh, J. and S. Shaked (eds) 2012. *Aramaic Documents from Ancient Bactria From the Khalili Collections*. London: Khalili Family Trust.

Nayeem, M.A. 1996. *The Sultanate of Oman* (Prehistory and Protohistory of the Arabian Peninsula 4). Hyderabad: Hyderabad Publishers.

Nebelsick, L.D. 2012. Scythian Eagles with Ionic Honeysuckle – Patterns of Iconographic Acculturation in the North Pontic Steppes during the 6th and 5th Centuries BC, in P. Anreiter, E. Banffy, L. Bartosiewicz, W. Meid and C. Metzner-Nebelsick (eds) *Archaeological, Cultural and Linguistic Heritage. Festschrift for Erzsebet Jerem in Honour of her 70th Birthday*: 449–73. Budapest: Adu Print.

Nebelsick, L.D. 2015. Ryba wpuszczona do wody: historyczny i kulturowy kontekst 'Skarbu z Vettersfelde', in A. Jaszewska and A. Michalak (eds) *Woda – żywioł ujarzmiony i nieujarzmiony*: 123–52. Zielona Góra: Stowarzyszenie Naukowe Archeologów Polskich Oddział Lubuski.

Neef, R. 2010. Die Pflanzenreste, in K. Chugunov, H. Parzinger and A. Nagler (eds) *Der skythenzeitliche Fürstenkurgan Aržan 2 in Tuva* (Archäologie in Eurasien 26 / Steppenvölker Eurasiens 3): 242–49. Mainz am Rhein: Philipp von Zabern.

Nefedkin, A. 2004. On the Origin of the Scythed Chariots. *Historia* 53/3: 369–78.

Nefedkin, A. 2005. On Typical Tactics of Oriental Chariot Battle. *The Ancient History Bulletin* [Calgary] 19/1–2: 1–14.

Nefedov, S.A. 2008. *Faktornyy analiz istoricheskogo protsessa. Istoriya Vostoka*. Moscow: 'Territory of the future'.

Nelson, C. (ed.) 1973. *The Desert and the Sown. Nomads in the Wider Society*. Berkeley: University of California Press.

Nerazik, E.E. and Yu.A. Rapoport 1981. Predmeti voorudjenia i bita, in E.E. Nerazik and Yu.A. Raport (eds) *Gorodishche Toprak-Kala (Raskopki 1965–1975 gg.)* (Trudy Khorezmskoj Arkheologo–Etnograficheskoj Ekspedicii, XII): 101–23. Moscow: Russian Academy of Sciences.

Newton, R. and S. Davison 1989. *Conservation of Glass*. Oxford: Butterworth Heinemann.

Nickel, H. 1973. Tamgas and Runes, Magic Numbers and Magic Symbols. *Metropolitan Museum Journal* 8: 165–73.

Nickel, L. 2006. Tonkrieger auf der Seidenstrasse? Die Plastiken des Ersten Kaisers von China und die hellenistische Skulptur Zentralasiens. *Zurich Studies in The History of Art/Georges Bloch Annual* 13/14: 124–49.

Nickel, L. 2013. The First Emperor and sculpture in China. *Bulletin of the School of Oriental and African Studies* 76/3: 413–47.

Nickel, L. 2015. Bricks in Ancient China and the Question of Early Cross-Asian Interaction. *Arts Asiatiques* 70: 49–62.

Nihon bagu taikan 1990. *Comprehensive Catalogue of Japanese Horse Trappings. Volume 1. Archaic Age. Part 1. Japan* [in Japanese]. Tokyo: Nihon Chūō Keibakai.

Nikitenko, I.S. 2018. Rezultaty mineralogo-petrograficheskogo analiza kollektsii obraztsov gornykh porod iz raskopok Aleksandropolskogo kurgana prilozheniye v Aleksandropole, in S.V. Polin and A.Yu. Alekseev (eds) *Skifskiy tsarskiy Aleksandropolskiy kurgan IV v. do n.e. v Nizhnem Podneprovye* (Kurgany Ukrainy 6): 726–31. Kiev: 'Naukova Dumka'.

Nikitenko, I.S. and S.V. Polin 2016. Proiskhozhdeniye stroitelnogo kamnya krepidy i pantsirya Aleksandropolskogo kurgana. *Geologo-mineralogicheskii visnik Krivorizkogo national university* 35/1: 37–45.

Nikolaev, N.N. 2012. Khunny, in O.A. Fedoseenko (ed.) *Kochevniki Evrazii na Puti k Imperii*: 118–31. St. Petersburg: State Hermitage Museum.

Nikolaev, N.N. 2017. A jewelry hoard from Znamenka, in St J. Simpson and S. Pankova (eds) *Scythians: warriors of ancient Siberia*: 330–35, cats 234–46. London: Thames and Hudson.

Nikolaev, N.N. and S.V. Pankova 2017. After the Scythians, in St J. Simpson and S. Pankova (eds) *Scythians: warriors of ancient Siberia*: 324–29. London: Thames and Hudson.

Nikonorov, V.P. 2001. Parfyanskiye sedla, in V.M. Masson (ed.) *Rol akhaltekinskogo konya v formirovanii mirovogo konnozavodstva*: 115–16. Ashgabat.

Nikonorov, V.P. 2002. Voennoye delo evropeyskikh gunnov v svete dannykh greko-latinskoy pismennoy traditsii, in V.M. Masson (ed.) *Zapiski Vostochnogo otdeleniya Rossiyskogo arkheologicheskogo obshchestva* (N.S.) 1 (26): 223–323. St. Petersburg: St. Petersburg Oriental Studies.

Nikonorov, V.P. 2004. A Unique Comb from Kampyr-Tepe (Northern Bactria), in J. Chochorowskiego (ed.) *Cimmerians, Scythians, Sarmatians. In memory of Professor Tadeusz Sulimirski*: 317–29. Kraków: Institute of Archaeology, Jagiellonian University.

Nikonorov, V.P. and Yu.S. Khudyakov 1999. Izobrazheniya voinov iz Orlatskogo mogilnika, in O.A. Mit'ko (ed.) *Evraziya: kulturnoye nasledie drevnikh tsivilizatsiy: Gorizonty Evrazii* 2: 141–54. Novosibirsk: Novosibirsk State University.

Nikulitse, I.T. 1987. *Severnyye frakiitsy v VI-I vv. do n.e.*. Kishinev: Shtiintsa.

Ningxia Huizu Zizhiqu Bowuguan Kaogudui 1987. Ningxia Zhongning Xian qingtong duanjian mu qingli jianbao [Excavation of the tombs with bronze daggers at Zhongning, Ningxia]. *Kaogu* 9: 773–77.

Ningxia Wenwu Kaogu Yanjiusuo and Ningxia Guyuan Bowuguan 1993. Ningxia Guyuan Yanglang qingtong wenhua mudi [Bronze culture cemetery at Yanglang, Guyuan, Ningxia]. *Kaogu* 1: 13–56.

Nițu, A. and N. Zaharia 1955. Informații sumare cu privire la cetatea de la Stânceşti (Botoşani). *Studii și Cercetări de Istorie Veche* 6/1–2: 333–36.

Noelke, P. 2006. Bildhauerwerkstätten im römischen Germanien. *Bonner Jahrbücher* 206: 87–144.

Nöldeke, T. 1930. *The Iranian National Epic or the Shahnamah: being the English translation from the German of Prof. T.* Nöldeke*'s Das Iranische Nationalepos*. Bombay: K.R. Cama Oriental Institute (second edition, translated by L. Bogdanov).

Ochir-Goryaeva, M.A. and V.V. Dvornichenko 2006. Osobennosti raspolozheniya predmetov uzdy v pogrebalnykh kompleksakh (po materialam mogilnika Krivaya Luka). *Nizhnevolzhskiy arkheologicheskiy vestnik* 8: 236–45.

O'Connell, T.C., M.A. Levine and R.E.M. Hedges 2003. The importance of fish in the diet of central Eurasian peoples from the Mesolithic to the Early Iron Age, in M.A. Levine, C. Renfrew and K. Boyle (eds) *Prehistoric Steppe Adaptation and the Horse*: 253–68. Cambridge: McDonald Institute for Archaeological Research.

Odom, A. 2011. *Russian Silver in America: Surviving the Melting Pot*. Washington, D.C. and London: Hillwood Museum and Gardens Foundation, in association with D. Giles Ltd.

Ogden, J.M. 1977. Platinum group metal inclusions in ancient gold artefacts. *Journal of the Historical Metallurgy Society* 11: 53–71.

Ogden, J.M. 1982. *Jewellery of the Ancient World*. London: Trefoil Books.

Ogden, J.M. 1991. Casting doubt: economic and technological considerations regarding metal casting in the ancient world, in P.B. Vandiver, J. Druzik and G. Segan Wheeler (eds) *Materials Issues in*

Art and Archaeology II. Symposium held April 17–21 1990, San Francisco, California, USA (Materials Research Society Symposium Proceedings 185): 713–17. Pittsburgh: Materials Research Society.

Ogden, J.M. 1992. *Ancient Jewellery*. London: British Museum Press.

Ogden, J.M. 1998. The jewellery of Dark Age Greece: construction and cultural connections, in D. Williams (ed.) *The Art of the Greek Goldsmith*: 14–21. London: British Museum Press.

Ogden, J.M. 2000. Metals, in P.T. Nicholson and I. Shaw (eds) *Ancient Egyptian Materials and Technology*: 148–76. Cambridge: Cambridge University Press.

Oka, H., Y. Ito, S. Yamada, T. Kagami, J. Hayakawa, K. Harada, E. Atsumi, M. Suzuki, H. Odani, S. Akahori, K. Maeda, T. Tanaka and M. Mizuno 1998. Identification of Lac Dye Components by Electrospray High Performance Liquid Chromatography-Tandem Mass Spectrometry. *Journal of the Mass Spectrometry Society of Japan* 46/1: 63–68.

Olbrycht, M.J. 2016. Archaeological discoveries at Tillya-tepe and Parthia's relations with Bactria. *Parthica* 18: 9–29.

Olkhovsky, V.S. 1977. Skifskiye katakomby v Severnom Prichernomorye. *Sovetskaya arkheologiya* 1977/4: 108–28.

Olkhovsky, V.S. 1991. *Pogrebalno-pominalnaya obryadnost naselenija stepnoj Skifii (VII–III vv. do n.e.)*. Moscow: Russian Academy of Sciences.

Olkhovsky, V.S. 2005. *Monumental'naya skulptura naseleniya zapadnoĭ chasti evraziĭskikh stepeĭ epokhi rannego zheleza.* Moscow: Russian Academy of Sciences.

Olkhovsky, V.S. and G.L. Yevdokimov 1994. *Skifskie izvayaniya VII–III vv. do n.e.* Moscow: MTO Meteo.

Onayko, N.A. 1970. *Antichnyy import v Pridneprovye i Pobuzhye v IV–II vv. do n.e.* (SAI D1-27). Moscow: Russian Academy of Sciences.

O'Neill, J.P. (ed.) 1996. *Ancient Art from the Shumei Family Collection.* New York: Metropolitan Museum of Art.

Orlyuk, M., R. Rolle, A. Romenets, B. Ulrich and H. Zöllner 2016. Mikromagnitnaya sjomka Bol`shogo Belskogo gorodishcha skifskogo vremeni, Poltavskaya oblast. *Geofizicheskij zhurnal* 15/38: 25–39.

Ortiz, G. 1993. *The George Ortiz Collection.* Bern: Benteli-Werd.

Osborne, R. 1999. Archaeology and the Athenian Empire. *Transactions of the American Philological Association* 129: 319–32.

Ostroverkhov, A.S. 1985. Fajansovye i stekljannye busy v Skifii i Sarmatii. *Vestnik drevnei istorii* 1985/3: 92–108.

Özgen, İ. and J. Öztürk 1996. *The Lydian Treasure: Heritage Recovered.* Istanbul: Republic of Turkey, Ministry of Culture, General Directorate of Monuments and Museums.

Öztürk, J. 1998. Lydian Jewellery, in D. Williams (ed.) *The Art of the Greek Goldsmith*: 41–47. London: British Museum Press.

Pang, T. (ed.) 1998. *Treasures of the Eurasian Steppes. Animal art from 800BC to 200AD*. New York: Ariadne Galleries.

Pankova, S. 2013. One more culture with ancient tattoo tradition in Southern Siberia: tattoos on a mummy from the Oglakhty burial ground, 3rd–4th century AD, in Ph. Della Casa and C. Witt (eds) *Tattoos and body modifications in antiquity* (Proceedings of the sessions at the EAA annual meetings the Hague and Oslo, 2010/11). *Zurich studies in archaeology* 9: 75–96.

Pankova, S. 2015. Jarusnye nakonechniki strel v tashtykskih gravirovkah, in V.P. Nikonorov and V.A. Alekshin (eds) *Akademicheskoe vostokovedenie v Rossii i stranah blizhnego zarubezh'ja (2007–2015): Arkheologiya, istoriya, kultura (Zapiski Vostochnogo otdelenija Rossiiskogo Arkheologichskogo obschestva)* (N.S.) 3 (28): 439–55. St. Petersburg: Contrast Ltd.

Pankova, S. 2016. Unearthed early silks from the Silk Road in Russia, in Zhao Feng (ed.) *Sichou Zhilu: yitiao sichou zhilu* [The Silk Road: a road of silk]: 54–66. Hangzhou: Donghua daxue chubanshe.

Pankova, S. 2017. Identifications of Iron Age Tattoos from the Altai-Sayan Mountains in Russia, in L. Krutak and A. Deter-Wolf (eds) *Ancient Ink: the Archaeology of Tattooing*: 65–84. Seattle and London: University of Washington Press.

Pankova, S. 2018. Kosy iz pogrebeniya 4 Oglakhtinskogo mogilnika (raskopki L.R. Kyzlasova 1969 g.), in N.Yu. Smirnov (ed.) *Pamyatniki arkheologii v issledovaniyah i fotografiyah (pamyaty G.V. Dluzhnevskoy)*: 132–39. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Sciences.

Pankova, S. 2020*a*. Skify v Velikobritanii: opyt sotrudnichestva Ermitazha i Britanskogo Muzeya. *Soobscheniya gosudarstvennogo Ermitazha* 78: 129–43.

Pankova, S. 2020*b*. Mehovye odezhdy iz Oglahtinskogo mogiljnika: shuby iz pogrebeniya 4 / Fur clothes from the cemetery of Oglakhty: coats from burial no. 4, in N.V. Khvoschinskaya (ed.), *Arkheologicheskiye Vesti / Archaeological News 26 (On the 90th anniversary of Aleksandr Danilovich Grach)*: 202–15 (Russian with English abstract). St. Petersburg: Russian Academy of Sciences, Institute for the History of Material Culture.

Pankova, S.V. and E.A. Mikolaychuk 2020. Kitayskiye shyolkovye tkany iz Oglakhtinskogo mogilnika v (raskopki 1969 goda), in Elkina, I.I., M. Wagner and P.E. Tarasov (eds) *Iskusstvo drevnego tekstilya. Metody izucheniya, sohrannosty, reconstruktsiya*. Moscow and Berlin: Nünnerich–Asmus Verlag & Media GmbH, Oppenheim am Rhein: 38-74.

Pankova, S.V., S.S. Vasilyev, V.A. Dergachyov and G.I. Zaytseva 2010. Radiocarbon dating of Oglakhty grave using a wiggle matching method. *Arkheologiya, Etnografiya i Antropologiya Evrazii* 42 (2010/2): 46–56.

Parkinson, C. Northcote 1957. *Parkinson's Law, and Other Studies in Administration*. Boston: Boston, Houghton Mifflin.

Parrot, A. 1961. *The Arts of Assyria*. New York: Golden Press.

Parzinger, H. 2010. Der skythenzeitliche Fürstenkurgan Aržan 2 in Tuva – Ergebnisse und weiterführende Betrachtungen, in K. Chugunov, H. Parzinger and A. Nagler (eds) *Der skythenzeitliche Fürstenkurgan Aržan 2 in Tuva* (Archäologie in Eurasien 26 / Steppenvölker Eurasiens 3): 303–29. Mainz am Rhein: Philipp von Zabern.

Parzinger, H. 2017. Burial Mounds of Scythian Elites in The Eurasian Steppe: New Discoveries. *Journal of the British Academy* 5/3: 331–55.

Parzinger, H. and N. Boroffka (in collaboration with K. Alimov, M. Bubnova, J.F. Burjakov, J. Jakubov, E. Pernicka and G. Weisgerber, and contributions by A. Atachodžaev, N. Benecke and J. Görsdorf) 2003. *Das Zinn der Bronzezeit in Mittelasien I. Die siedlungsarchäologischen Forschungen im Umfeld der Zinnlagerstätten* (Archäologie in Iran und Turan 5). Mainz am Rhein: Philipp von Zabern.

Parzinger, H., A. Gass and Y. Fassbinder 2017. Arkheologo-geofizicheskiye issledovaniya mogilnikov rannego zheleznogo veka na territorii Kazakhstana i Severnogo Kavkaza, in V.I. Molodin and S. Hansen (eds) *Multidisciplinarnyye metody v arkheologii: Noveyshiye itogi i perspektivy. Materialy mezhdunarodnogo simpoziuma 'Multidisciplinarnyye metody v arkheologii: noveyshiye itogi i perspektivy' (22–26 iyunya 2015 g., g. Novosibirsk)*: 216–39. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Parzinger, H., A. Nagler and A. Gotlib 2010. Der tagarzeitliche Großkurgan von Barsučij Log in Chakassien. Ergebnisse der deutsch–russischen Ausgrabungen 2004–2006. *Eurasia Antiqua* 16: 169–281.

Parzinger, H., V. Zajbert, A. Nagler and A. Pleshakov 2003. *Der große Kurgan von Bajkara. Studien zu einem skythischen Heiligtum* (Archäologie in Eurasien 16). Mainz am Rhein: Philipp von Zabern.

Parzinger, H., A. Gass, J. Fassbinder and A. Belinskiy 2015. Interdisziplinäre Erforschung der Gräberfelder mit früheisenzeitlichen Großkurganen im Nordkaukasus, in M.T. Kashuba, S. Reinhold and V.A. Alekshin (eds) *Der Kaukasus im Spannungsfeld zwischen Osteuropa und Vorderem Orient: Dialog der Kulturen, Kultur des Dialoges (im Gedenken an den 140. Geburtstag von Alexander A. Miller). Internationale Fachtagung für die Archäologie und Humboldt-Kolleg (5.-8. Oktober 2015, Sankt Petersburg)*: 49–53. St. Petersburg: St. Petersburg: Institute for the History of Material Culture, Russian Academy of Sciences.

Parzinger, H., A. Gass and J. Fassbinder 2016. At the Foot of Royal Kurgans. The latest geoarchaeological and geophysical studies. *Science First Hand* 43/1: 74–89.

Paul, J. 2003. The State and the Military – a Nomadic Perspective, in I. Schneider (ed.) *Militär und Staatlichkeit. Beiträge des Kolloquiums am 29. und 30.04.2002, Halle* (Orientwissenschaftliche Hefte 12 / Mitteilungen des SFB 'Differenz und Integration' 5): 25–68. Halle: Universities of Leipzig and Halle-Wittenberg.

Păunescu, A., Șadurschi, P. and V. Chirica 1976. *Repertoriul arkheologic al județului Botoșani*. Bucharest: Institute of Archaeology.

Payne, R. 2015. The Reinvention of Iran: The Sasanian Empire and the Huns, in M. Maas (ed.) *The Cambridge Companion to the Age of Attila*: 282–99. Cambridge: Cambridge University Press.

Perevodchikova, Ye.V. 1994. *Yazyk zverinykh obrazov: Ocherki iskusstva evraziyskikh stepey skifskoy epokhi*. Moscow: 'Oriental Literature', Russian Academy of Sciences.

Perry, M.A. 2007. Is bioarchaeology a handmaiden to history? Developing a historical bioarchaeology. *Journal of Anthropological Archaeology* 26: 486–515.

Persic, A.I. 1994. Voyna i mir na poroge tsivilizatsii: kochevye skotovody, in A.I. Persic, Yu.I. Semenov and V.A. Shnirelman (eds) *Voina i mir v ranney istorii chelovechestva*: vol. II/3, 129–245. Moscow: Institute of Ethnology and Anthropology, Russian Academy of Sciences.

Peterson, D.L., L.M. Popova and A.T. Smith (eds) 2006. *Beyond the steppe and the sown. Proceedings of the 2002 University of Chicago Conference on Eurasian Archaeology* (Colloquia Pontica 13). Leiden and Boston: E.J. Brill.

Petrenko, V.G. 1967. *Pravoberezhye Srednego Pridneprovya v V–III vv. do n.e.* Moscow: Russian Academy of Sciences.

Petrenko, V.G. 1986. O yugo-vostochnoy granitse rasprostraneniya skifskikh kamennykh izvayaniy, in V.I. Markovin (ed.) *Novoe v arkheologii Severnogo Kavkaza*: 158–57. Moscow: Russian Academy of Sciences.

Petrenko, V.G. 1989. Lokalnye gruppy skifoobraznoy kultury lesostepi Vostochnoy Evropy, in A.I. Melyukova (ed.) *Stepi Evropeiskoy chasti SSSR v skifo-sarmatskoe vremya* (Arkheologia SSSR): 67–79. Moscow: Russian Academy of Sciences.

Petrenko, V.G. 2006. *Krasnoznamensky mogilnik*. Moscow / Berlin / Bordeaux: Paleograph.

Petrenko, V.G., V.E. Maslov and A.R. Kantorovich 2000. Khronologiya tsentralnoy gruppy mogilnika Novozavedennoye-II, in V.I. Gulyaev and V.S. Olkhovsky (eds) *Skify i Sarmaty v VII–III vv. do n.e.: paleoekologiya, antropologiya, arkheologiya*: 238–48. Moscow: Institute of Archaeology, Russian Academy of Sciences.

Petroutsa, E. and S. Manolis 2010. Reconstructing the Late Bronze Age diet in mainland Greece using stable isotope analysis. *Journal of Archaeological Science*: 614–20.

Petroviciu, I., D. Creanga, I. Melinta, I. Cretu, A. Medvedovici and F. Albu 2011. The use of LC-MS in the Identification of Natural Dyes in the Epitaphios

from Sucevita Monastery (15th century). *Revue Roumaine de Chimie* 56/2: 161–68.

Petroviciu, I., A. Medvedovici, F. Albu, I. Cretu and I. Vanden Berghe 2012. LC-MS as Analytical Technique for the Identification of Natural Dyes in Historic Textiles. *Romanian Reports in Physics* 64/2: 507–15.

Pfisterer, M. 2013. *Hunnen in Indien. Die Münzen der Kidariten und Alchan aus dem bernischen historischen Museum und der Sammlung Jean-Pierre Righetti. Mit typologischen Zeichnungen von Theresa Eipeldauer* (Veröffentlichungen zur Numismatik 57 / Denkschriften der phil.-hist. Klasse der Österreichischen Akademie der Wissenschaften 459). Vienna: Austrian Academy of Sciences.

Pfrommer, M. 1996. Die Gräber von Tillya-tepe – Eine späthellenistisch-frühkaiserzeitlische Nekropole zwischen achämenidischen Erbe, griechischer Tradition und nomadisch-zentralasiatischer Gegenwart, in B. Funck (ed.) *Hellenismus. Beiträge zur Erforschung von Akkulturation und politischer Ordnung in den Staaten des hellenistischen Zeitalters, Akten Internationalen Hellenismus-Kolloquium 9, 1994*: 91–120. Tübingen: Mohr.

Pfrommer, M. 1998. *Untersuchungen zur Chronologie und Komposition des Alexandermosaiks auf antiquarischer Grundlage* (Aegyptiaca Trevenensia, Trierer Studien zum Griechisch-Römischen Ägypten 8). Mainz am Rhein: Philipp von Zabern.

Piankov, I.V. 1994 [1996]. The ethnic history of the Sakas. *Bulletin of the Asia Institute* (N.S.) 8: 37–46.

Picard, Ch. and P. de la Coste-Messelière 1954. *Fouilles de Delphes, IV,2. Les trésors ioniques*. Paris: de Boccard.

Pickford, J. 2017. Ice warriors: Scythian warriors set for display. *Financial Times* 31 May: 2.

Pilipenko, A.S., R.O. Trapezov and N.V. Polosmak 2015. Paleogeneticheskoye issledovaniye nositeley pazyrykskoy kul'tury iz mogil'nika ak-alakha-1 (gornyy altay). *Anthropology and Palaeogenetics* 43/4: 147–53.

Pilipko, V.N. 1996. *Staraya Nisa. Zdaniye s kvadratnym zalom*. Moscow: 'Oriental Literature', Russian Academy of Sciences.

Pioro, V.I. and L.G. Samoylenko 2001. Nakhodki drevnegrecheskikh amfor v skifskikh kurganakh Dnepropetrovshchiny, in M.I. Gladkykh (ed.) *Morska torgovlya v Pivnichnomu Prichornomor'i*: 26–42. Kiev: Taras Shevchenka National University.

Piotrovsky, B.B. 1950. *Karmir Blur, I*. Yerevan: Armenian SSR Academy of Sciences.

Piotrovsky, B.B. [1975]. Early cultures of the land of the Scythians; excavations and discoveries in Scythian lands, in *From the Lands of the Scythians: ancient treasures from the Museums of the U.S.S.R. 3000 B.C.–100 B.C.*: 12–31. New York and Los Angeles: Metropolitan Museum of Art and Los Angeles County Museum of Art.

Piotrovsky, B., L. Galanina and N. Grach 1986. *Scythian art. The legacy of the Scythian world: mid-7th to 3rd century B.C.* Leningrad: Aurora.

Piotrovsky, M.B. and Yu. Piotrovsky (eds) 1998. *Shliman, Peterburg, Troya*. St. Petersburg: Slavia.

Piotrovsky, M.B., A.T. Adamova and A.B. Nikitin (eds) 2004. *Iran v Ermitazhe. Formirovanie kollektsii*. St. Petersburg: Slavia.

Pirazzoli-t'Serstevens, M. 1994. Pour une archéologie des échanges. Apports étrangers en Chine – transmission, réception, assimilation. *Arts Asiatiques* 49: 21–33.

Pirazzoli-t'Serstevens, M. 2007. Inner Asia and Han China: Borrowings and Representations, in T. Lawton (ed.) *New Frontiers in Global Archaeology: Defining China's Ancient Traditions*: 1–20. Washington: AMS Foundation for the Arts, Sciences and Humanities.

Plamenevskaya, O.L. 1975. Nekotorye dannye o tkanyakh iz kurgana Arzhan. *Uchenye Zapiski Tuvinskogo Nauchno-issledovatel'skogo Instituta yazyka, literatury i istorii. Vyp. XVII* 17: 199–206. Kyzyl: Tuva Book Press.

Plavan, V., L. Miu, M. Daragan, N. Gavrilyuk, V. Barsukov and A. Ibragimova 2012. Study of deterioration of archaeological collagen-based artefacts, in L. Albu and V. Deselnicu (eds) *Proceedings of the 4th International Conference on Advanced Material and Systems, Bucharest, Romania*: 511–16. Bucharest: CERTEX.

Pleshivenko, A.G. 1991*a*. Skifskiy kurgan u Belozerskogo limana, in E.P. Bunyatyan and Yu.V. Boltrik (eds) *Kurgany stepnoy Skifii*: 53–72. Kiev: 'Naukova Dumka'.

Pleshivenko, A.G. 1991*b*. Torgovye svyazi Kamenskogo gorodischa (po amfornym kleymam), in G.N. Toshchev (ed.) *Drevnosti Severnogo Prichernomorya i Kryma* 3: 162–72.

Pleshivenko, A.G. 2000. Kapulovsky kompleks skifskogo vremeni (po materialam kollektsii A.V. Bodyanskogo), in G.N. Toshchev (ed.) *Drevnosti Severnogo Prichernomorya i Kryma* 8: 222–36.

Podolsky, M.L. 2002. Znamenskii klad iz Khakasii, in D.G. Savinov (ed.) *Khladi: sostav, khronologiya, interpretatsiya*: 229–34. St. Petersburg: St. Petersburg State University.

Podolsky, M.L. 2010. *Zver, kotory byl sam po sebe, ili fenomenologiya skifskogo zverinogo stilya*. St. Petersburg: ElekSis.

Podushkin, A.N. 2019. Novyye arkheologicheskiye kompleksy mogilnikov Kylyshzhar Myntobe, in B.A. Baytanayev (ed.) *Margulanovskiye chteniya 2019. Materialy mezhdunarodnoy arkheologicheskoy nauchno-prakticheskoy konferentsii, posvyashchennoy 95-letiyu so dnya rozhdeniya vydayushchegosya kazakhstanskogo arkheologa K.A. Akisheva, Nur-Sultan, 19–20 aprelya 2019 g.*: 153–69. Nur Sultan: 'Globus'.

Pokutta, D.A., A.P. Borodovskiy, L. Oleszcak, P. Tóth and K. Lidén 2019. Mobility of Nomads in Central Asia: Chronology and $^{87}SR/^{86}SR$ isotope evidence from the Pazyryk burials of Northern Altai, Russia. *Journal of Archaeological Science: Reports* 27.

Polidovich, Yu. B. 2006. Khishchnik i ego zhertva: vyrazhenie krugovorota zhizni i smerti sredstvami

skifskogo zoomorfnogo koda, in anon. (ed.) *Strukturno-semioticheskie issledovaniya v arkheologi* 3: 355–98. Donetsk: Donetsk National University.

Polidovich, Yu.B. and N.I. Malyuk 2016. Obraz ryby v iskusstve skifo-sarmatskogo vremeni, in L.T. Yablonsky and L.A. Kraev (eds) *Konstantin Fedorovich Smirnov i sovremennyye problemy sarmatskoy arkheologii*: 209–16. Orenburg: Ogly.

Polin, S.V. 1984. Pro sarmatske zavoyuvannya Pivnichnogo Prichornomorya. *Arkheologiya* 1984/45: 24–34.

Polin, S.V. 1986. Poyavlenie sarmatov v Severnom Prichernomore po arkheologicheskim dannym, in *Khozyaysthe bnvo i kultura doklassovyh i ranneklassovyh obschestv. Tezisy dokladov III konferentsii molodyh uchenyh IA AN SSSR*: 116–18. Moscow: Tipya Instituta Istorii AN SSSR.

Polin, S.V. 1987. Khronologiya rannesarmatskoy prohorovskoy kultury, in *Aktualnye problemy istoriko-arkheologicheskih issledovanij. Tezisy dokladov VI Respublikanskoy konferetsii molodyh uchenyh. Kiev, oktyabr 1987 g.*: 132–33. Kiev: National Academy of Sciences of Ukraine.

Polin, S.V. 1991. Amfory kurgana Chertomlyk, in A.Yu. Alekseev, V.Yu. Murzin and R. Rolle (eds) *Chertomlyk. Skifskiy tsarskiy kurgan IV v. do n.e.*: 365–74. Kiev: National Academy of Sciences of Ukraine.

Polin, S.V. 1992. *Ot Skifii k Sarmatii*. Kiev: Institute of Archaeology, National Academy of Sciences of Ukraine.

Polin, S.V. 2010. Amfory Aleksandropol'skogo kurgana (po materialam raskopok 2004-2009 gg.). *Antichnyy mir i arkheologiya* 14: 262–307.

Polin, S.V. 2011*a*. K istorii razvitiya metodiki raskopok bol'shyh skifskih kurganov, in *Metodika polevyh arkheologicheskih issledovaniy, t. 4. Grecheskie i varvarskie pamyatniki Severnogo Prichernomorya. Opyt metodiki rossiyskih i ukrainskih polevyh issledovanij*: 206–22. Moscow: Institute of Archaeology, Russian Academy of Sciences.

Polin, S.V. 2011*b*. Amfory i klejma iz kurgana No. 32 u g. Ordzhonikidze I nekotoryie voprosy amfornoy khronologii. *Antichny mir i arkheologiya* 15: 240–64.

Polin, S.V. 2014. *Skifskiy Zolotobalkovskiy kurgannyy mogilnik V–IV vv. do n.e.* Kiev: Institute of Archaeology, National Academy of Sciences of Ukraine.

Polin, S.V. 2015. O khronologii fasosskogo kleymeniya IV v. do n.e. *Trudy gosudarstvennogo Ermitazha* 77: 334–58.

Polin, S.V. 2017. Sarmatskoye zavoevaniye Severnogo Prichernomorya (sovremennoye sostoyaniye problemy). *Epokha bronzy i ranniy zhelezniy vek. Arkheologiya evraziyskikh stepey* 3: 224–43.

Polin, S.V. and A.Yu. Alekseev 2018. *Skifskiy tsarskiy Aleksandropolskiy kurgan IV v. do n.e. v Nizhnem Podneprovye* (Kurgany Ukrainy 6). Kiev: National Academy of Sciences of Ukraine.

Polin, S.V. and M.N. Daragan 2010. Raboty na Aleksandropolskom kurgane v 2008 g., in ΣΥΜΒΟΛΑ 1. Antichnyy mir Severnogo Prichernomoria. Noveyshiye nakhodki i otkrytiya: 191–209. Moscow and Kiev: ID Triumf Print.

Polin, S.V. and M.N. Daragan 2011. Das Prunkgrab Alexandropol'-Kurgan. Vorbericht über die Untersuchungen in den Jahren 2004–2009. *Eurasia Antiqua* 17: 189–214.

Polin, S.V. and A.V. Simonenko 1990. 'Rannesarmatskie' pogrebenija Severnogo Prichernomorya, in I.F. Kovaleva (ed.) *Issledovaniya po arkheologii Podneprovya*: 76–96. Dnepropetrovsk: Izdatelstvo DGU.

Polin, S.V. and A.V. Simonenko 1997. Skifija i sarmaty, in V.E. Maksimento (ed.) *Sarmaty i Skifiya. Sbornik nauchnyh dokladov III mezhdunarodnoy konferentsii 'Problemy sarmatskoj arkheologii i istorii'* (Donskie drevnosti 5): 87–98. Azov: Azovskiy krayevedcheskiy muzey.

Polin, S.V. and A.V. Simonenko 2004. Sarmaty i gibel Velikoy Skifii, in J. Chochorowski (ed.) *Cimmerians. Scythians. Sarmatians. In memory of Professor T. Sulimirski*: 367–74. Krakow: Ksiegarnia akademicka.

Polin, S.V., L.A. Chernykh, M.N. Daragan and S.N. Razumov 2008. Issledovaniya kurganov epohi bronzy i skifskogo perioda u g. Ordzhonikidze (Ukraina), sezon 2007 g. (predvaritelnoye soobshcheniye). *Revista Arkheologica* 4/1: 135–45.

Polosmak, N.V. 1994*a*. *Steregushchie zoloto grify (ak-alakhinskie kurgany)*. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Polosmak, N.V. 1994*b*. The Ak-Alakh 'Frozen Grave' Barrow. *Ancient Civilizations from Scythia to Siberia* 1/3: 346–54.

Polosmak, N.V. 1994*c*. A mummy unearthed from the pastures of heaven. *National Geographic* 186: 80–103.

Polosmak, N.V. 1996*a*. Pogrebenie znatnoj pazyrykskoj zhenshchiny. *Vestnik drevnei istorii* 1996/4: 142–67.

Polosmak, N.V. 1996*b*. Investigations of a Pazyryk Barrow at Kuturguntas. *Ancient Civilizations from Scythia to Siberia* 2/1: 91–111.

Polosmak, N.V. 1998*a*. Pazyrykskie analogi v mogilakh Sin'czjana, in A.P. Derevyanko and V.I. Molodin (eds) *Problemy arkheologii, etnografii, antropologii Sibiri i sopredel'nikh territorij*: vol. IV, 337–43. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Polosmak, N.V. 1998*b*. The Burial of a Noble Pazyryk Woman. *Ancient Civilizations from Scythia to Siberia* 5/2: 125–63.

Polosmak, N.V. 2000. Pazyryk felt blankets: the Ukok collection. *Arkheologiya, Etnografiya i Antropologiya Evrazii* 1 (2000/1): 94–100.

Polosmak, N.V. 2001. *Vsadniki Ukoka*. Novosibirsk: Infolio Press.

Polosmak, N.V. 2009. 'Tam na nevedomykh dorozhkakh sledy nevidannykh zverey ...'. Serebryanye

ukrasheniya konskoy upryazhi iz kurganov khunnu. *'Nauka' iz pervykh ruk* 5: 64–75.

Polosmak, N.V. 2010. 'My vypili Somu, my stali bessmertnymi ...'. *'Nauka' iz pervykh ruk* 33: 50–59.

Polosmak, N.V. 2011. Svet dalekoj Ellady. *'Nauka' iz pervykh ruk* 37/1: 94–107.

Polosmak, N.V. 2012. History embroidered in wool. *'Nauka' iz pervykh ruk* 31/1 (April): 88–109.

Polosmak, N.V. 2015. Nouvelles découvertes de tentures polychromes brodées du début de notre ère dans les *tumuli* n°20 and n°31 de Noin-Ula (République de Mongolie). *Arts Asiatiques* 70: 3–32.

Polosmak, N.V. and L.L. Barkova (eds) 2005. *Kostyum i tekstil' pazyryktsev Altaya (IV-III vv. do n.e.).* Novosibirsk: Infolio Press.

Polosmak, N.V. and V.A. Trunova 2006. Mortal Delight. SR Finds the Murderer. *Science First Hand* 7/2 (February) http://scfh.ru/en/papers/mortal-delight-sr-finds-the-murderer/

Polosmak, N.V., E.S. Bogdanov and D. Ceveendorzh 2011. *Dvadcatij noin-ulinskij kurgan*. Novosibirsk: Infolio Press.

Polosmak, N.V., S.S. Shatskaya, M.V. Zadorozhny, L.P. Kundo and E.V. Karpova 2019. Rezul'taty issledovaniy zolotykh izdeliy iz pogrebeniy khunnu Noin-Ula (Mongoliya). *Arkheologiya, Etnografiya i Antropologiya Evrazii*: 47 (2019/1): 83–94.

Polyakov, A.V. and I.P. Lazaretov 2020. Current state of the chronology for the palaeometal period of the Minusinsk basins in southern Siberia. *Journal of Archaeological Science: Reports* 29. https://doi.org/10.1016/j.jasrep.2019.102125

Polyakov, A.V. and S.V. Svyatko 2009. Radiouglerodnoe datirovanie arkheologicheskih pamyatnikov neolita – nachala zheleznogo veka Srednego Eniseya: obzor rezultatov i novye dannye. *Teorija i praktika arkheologicheskih issledovanij* 5: 20–56.

Popescu, E. and A. Vulpe 1982. Nouvelles découvertes du type Ferigile. *Dacia* (N.S.) 26: 77–114.

Popova, E.A. 1976. Ob istokakh traditsiy i evolyutsii form skifskoy skulptury. *Sovetskaya Arkheologiya* 1976/1: 108–21.

Porucznik, J. 2013. The image of a 'drunken Scythian' in Greek tradition. *Proceedings of the First Annual International Interdisciplinary Conference AIIC 2013, 24-26 April 2013, Azores, Portugal*: vol. 2, 710–14. Kocani: Egalite.

Posch, W. 1995. *Baktrien zwischen Griechen und Kuschan: Untersuchungen zu kulturellen und historischen Problemen einer Übergangsphase mit einem textkritischen Exkurs zum Shiji 123*. Wiesbaden: Harrassowitz.

Possehl, G.L. 1981. Cambay Beadmaking. *Expedition* 23/4: 39–47.

Possehl, G.L. 1996. Meluhha, in J. Reade (ed.) *The Indian Ocean in antiquity*: 133–208. London: Kegan Paul International.

Potts, D.T. 1999. *The Archaeology of Elam*. Cambridge: Cambridge University Press.

Potts, D.T. 2011. Indianesque ivories in southeastern Arabia, in C. Lippolis and S. de Martino (eds) *Un impaziente desiderio di scorrere il mondo. Studi in honore di Antonio Invernizzi per il suo settantesimo compleanno* (Monographie di Mesopotamia 14): 335–44. Firenze: Casa Editrice Le Lettere.

Potts, D.T. 2012. A 'Scythian' pick from Vaske (Gilan) and the identity of the XVIIth delegation at Persepolis, in H.D. Baker, K. Kaniuth and A. Otto (eds) *Stories of Long Ago. Festschrift für Michael D. Roaf*: 459–70. Münster: Ugarit-Verlag.

Potts, D.T. 2014. *Nomadism in Iran*. Oxford: Oxford University Press.

Potyomkin, T.M. 1985. *Bronzovyy vek lesostepnogo Pritobolya*. Moscow: Russian Academy of Sciences.

Pound, L. 1906. Arnold's sources for Sohrab and Rustum. *Modern Language Notes* 21: 15–17.

Prabhakar, V.N. 2016. An Overview of the Stone Bead Drilling Technology in South Asia from Earliest Times to Harappans. *Heritage: Journal of Multidisciplinary Studies in Archaeology* 4: 47–74.

Prabhakar, V.N. 2018. Decorated Carnelian Beads from the Indus Civilization Site of Dholavira (Great Rann of Khachchha, Gujarat), in D. Frenez, G.M. Jamison, R.W. Law, M. Vidale and R.H. Meadow (eds) *Walking with the Unicorn. Social Organization and Material Culture in Ancient South Asia. Jonathan Mark Kenoyer Felicitation Volume*: 476–85. Oxford: Archaeopress Archaeology.

Price, K. and M. Gleba 2012. Textiles on Egyptian Mirrors: Pragmatics or Religion? *Archaeological Textiles Review* 54: 2–13.

Priestley, J. and V. Zali (eds) 2016. *Brill's Companion to the Reception of Herodotus in Antiquity and Beyond* (Brill's Companions to Classical Reception, 6). Leiden and Boston: E.J. Brill.

Priestman, S. 2008. Islamic Pottery in Oman, in A. al-Salimi, H. Gaube and L. Korn *et al. Islamic Art in Oman*: 260–81. Muscat: Al Roya Press.

Printseva, G.A. 2005. Precious and Rare Objects, in R.E. Kistemaker, N.P. Kopaneva, D.J. Meijers and G.V. Vilinbakhov (eds) *The Paper Museum of the Academy of Sciences in St. Petersburg c.1725–1760. Introduction and Interpretation*: 209–16. Amsterdam: Royal Netherlands Academy of Arts and Sciences.

Printseva, G.A. 2011. *The Siberian Route of Pavel Piasetsky*. St. Petersburg: State Hermitage Museum.

Privat, K.L., J. Schneeweiß, N. Benecke, S.K. Vasiliev, T.C. O'Connell, R.E.M. Hedges and O. Craig 2005. Economy and diet at the Late Bronze Age – Iron Age site of Čiča: artefactual, archaeozoological and biochemical analyses. *Eurasia Antiqua* 11: 419–48.

Provencal, V.L. 2015. *Sophist Kings: Persians as other in Herodotus*. London: Bloomsbury.

Pruglo, V.I. 1972. Englificheskiye kleyma Geraklei Pontiyskoy iz Mirmekiya. *Kratkiye soobshcheniya Instituta arkheologii* 130: 12–20.

Pshenichnyuk, A.H. 1989. *Raskopki 'carskogo' kurgana na Yuzhnom Urale (preprint doklada)*. Ufa.

Pshenichnyuk, A.H. 2001. Filippovskie kurgany v centre skifskogo mira, in M.B. Piotrovsky (ed.) *Zolotye oleni Evrazii*: 26–37. St. Petersburg: 'Slaviya'.

Pugachenkova, G.A. 1966. *Khalchayan*. Tashkent: 'Fan'.

Pugachenkova, G.A. 1971. *Skul'ptura Khalchayana.* Moscow: 'Iskusstvo'.

Pugachenkova, G.A. 1979. Dzhigatepe (raskopki 1974g.). *Drevnyaya Baktriya* 2: 63–94. Moscow: Russian Academy of Sciences.

Pugachenkova, G.A. 1989. *Drevnosti Miankalya. Iz rabot Uzbekistanskoy iskusstvovedcheskoy ekspeditsii*. Tashkent: 'Fan'.

Pugachenkova, G. and L.I. Rempel 1991. Gold from Tillia-tepe. *Bulletin of the Asia Institute* 5: 11–25.

Pugachenkova, G.A., E.V. Rtveladze and K. Kato 1991. *Drevnosti yuzhnogo Uzbekistana / Minami Uzubekisutan no ihō / Antiquities of Southern Uzbekistan*. Tashkent and Tokyo: The Khamza Fine Arts Research Centre and Soka University Press.

Puzdrovsky, A.E. 1994. O sarmatah v Krymu, in *Materialy po arkthe heologii i etnografii Tavrii* 4: 397–405.

Puzdrovsky, A.E. 1999. Etnicheskaja istorija Krymskoj Skifii (II v. do n.e. – III v. n.e.). *Khersonesskij sbornik* 10: 208–25.

Puzdrovsky, A.E. 2001. Politicheskaya istoriya Krymskoj Skifii vo II v. do n.e. – III v. n.e.. *Vestnik drevnei istorii* 2001/3: 86–118.

Puzdrovsky, A.E. 2007. *Krymskaja Skifija. II v. do n.e. – III v. n.e. Pogrebal'nye pamjatniki*. Simferopol: Biznes-Inform.

Qi Xiaoshan and Bo Wang (eds) 2008. *Sichou Zhilu: Xinjiang gudai wenhua* [*The ancient culture in Xinjiang along the Silk Road*]. Wulumuqi: Xinjiang remin chubanshe.

Qin Shihuangdi Ling Bowuyuan 2012. *Qin Shihuangdi ling chutu yihao qingtong mache* [Bronze chariot no. 1 excavated in the mausoleum of the First Emperor of Qin]. Beijing: Wenwu chubanshe.

Qin Shihuangdi Ling Bowuyuan 2015. *Qin Shihuangdi ling chutu erhao qingtong mache* [Bronze chariot no. 2 excavated in the mausoleum of the First Emperor of Qin]. Beijing: Wenwu chubanshe.

Qinyong Kaogudui 1983. Qin Shihuang ling erhao tong chema qingli jianbao [Brief report on the excavation of bronze chariot no. 2 from the mausoleum of the First Emperor of Qin]. *Wenwu* 7: 1–15.

Rak, I.V. (ed.) 1998. *Avesta v Russkih Perevodah (1861–1996)*. St. Petersburg: Zhurnal 'Neva' i Letnij Sad.

Rao, S.R. 1979/85. *Lothal. A Harappan Port* (Memoirs of the Archaeological Survey of India 78). New Delhi: Archaeological Survey of India (two volumes).

Rapin, C. 1992. *La trésorerie du palais hellénistique d' Aï Khanoum. L'apogée et la chute du royaume grec de Bactriane* (Fouilles de Aï Khanoum VIII / Mémoires de la delegation archéologique française en Afghanistan XXXIII). Paris: de Boccard.

Rapin, C. 2007. Nomads and the shaping of Central Asia: from the early Iron Age to the Kushan period, in J. Cribb and G. Herrmann (eds) *After Alexander: Central Asia before Islam*: 29–72. Oxford: Oxford University Press.

Rapin, C. 2018. On the way to Roxane 2. Satraps and hyparchs between Bactra and Zariaspa-Maracanda, in J. Lhuillier and N. Boroffka (eds) *A Millennium of History. The Iron Age in southern Central Asia (2nd and 1st Millennia BC). Proceedings of the conference held in Berlin (June 23–25, 2014). Dedicated to the memory of Viktor Ivanovich Sarianidi* (Mémoires de la Délégation Archéologique Française en Afghanistan XXXV). *Archäologie in Iran und Turan* 17: 257–98.

Rapin, C., M. Isamiddinov and M. Khasanov 2001. La tombe d'une princesse nomade à Koktepe près de Samarkand. *Comptes rendus de l'Académie des Inscriptions et Belles-Lettres* 2001 (January–March): 33–92.

Rast-Eicher, A. 2016. *Fibres. Microscopy of Archaeological Textiles and Furs*. Budapest: Archaeolingua.

Ratnagar, S. 1981. *Encounters: The Westerly Trade of the Harappa Civilization*. London: Oxford University Press.

Rau, P. 1929. *Die Graber der Frühen Eisen Zeit im unteren Wolgagebiet*. Pokrovsk: People's Commissariat for Education of the Volga-German Republic.

Rawson, J. 1999. The eternal palaces of the Western Han: A new view of the universe. *Artibus Asiae* 59: 5–58.

Rawson, J. 2015. Steppe weapons in ancient China and the role of hand-to-hand combat. *The National Museum Research Quarterly* 33/1: 37–97.

Rawson, J. 2018. Gold, an exotic material in early China, in K.M. Linduff and K.S. Rubinson (eds) *How Objects Tell Stories. Essays in Honor of Emma C. Bunker*: 109–35. Turnhout: Brepols.

Rawson, J., K. Chugunov, Y. Grebnev and L. Huan 2020. Chariotry and prone burials: reassessing late Shang China's relationship with its Northern neighbours. *Journal of World Prehistory* 33/2: 135-68.

Rayevsky, D.S. and M.N. Pogrebova 1997. *Zakavkazskiye bronzovye poyasa s gravirovannymi izobrazheniyami*. Moscow: 'Oriental Literature', Russian Academy of Sciences.

Read, C. 1912. On a Silver Sassanian Bowl of about the year 400 A.D., found in the NW. Provinces of India. *Archaeologia* 63: 251–56.

Reade, J. 1979. *Early etched beads and the Indus-Mesopotamia Trade* (British Museum Occasional Papers 2). London: The British Museum.

Reade, J. 1989. On site at the crossroads of the Arabian Sea. *British Museum Society Bulletin* 60 (spring): 21–23.

Reade, J. 1990. Excavations at Ra's al-Hadd, 1988. Preliminary report, in S. Cleuziou, J. Reade and M. Tosi (eds) *The Joint Hadd Project. Summary report on the third season (October 1987–February 1988)*: 33–43. Naples: Istituto Universitario Orientale.

Reade, J. 1998. Assyrian illustrations of Arabs, in C.S. Phillips, D.T. Potts and S. Searight (eds) *Arabia and*

its Neighbours. Essays on prehistorical and historical developments presented in honour of Beatrice de Cardi (Abiel II): 221–32. Turnhout: Brepols.

Redfern, D. 2000. A Technical Examination of the Scythian Gold Hoard from Vettersfelde / Witaszkowo. *Eurasia Antiqua* 6: 405–18.

Redfern, D. 2012. *A Study of Scythian Gold Jewellery Manufacturing Technology and its Comparison to Greek Techniques from the 7th to 5th Centuries BC* (BAR International Series 2424). Oxford: Archaeopress.

Reeder, E.D. (ed.) 1999. *Scythian Gold: treasures from ancient Ukraine*. New York: Harry N. Abrams.

Rehm, E. 2013. Toreutische Werke in Zentrum und Peripherie – Gedanken zu Stil und Werkstätten achämenidischer und achämenidisierender Denkmäle, in M. Treister and L. Yablonsky (eds) *Einflüsse der achämenidischen Kultur* im südlichen Uralvorland (5.–3. *Jh. v. Chr.)*: 35–52. Vienna: Phoibus Verlag.

Rehren, T. and I.C. Freestone 2015. Ancient glass: from kaleidoscope to crystal ball. *Journal of Archaeological Science* 56: 233–41.

Reifarth, N. and R. Drevello 2011. Textile Spuren in der Königsgruft. Vorbericht zu ersten Ergebnissen und dem Potential zukünftiger Forschungen, in P. Pfälzner (ed.) *Interdisziplinäre Studien zur Königsgruft von Qatna*: 469–82. Wiesbaden: Otto Harrassowitz.

Rempel, L.I. 1977. Fragmenty bronzovoy statui verblyuda iz Samarkanda i krylatyy verblyud Varakhshi (k voprosu o prirode sogdiyskogo iskusstva), in B.G. Gafurov and B.A. Litvinsky (eds) *Srednyaya Aziya v drevnosti i srednevekovye (istoriya i kultura)*: 97–102. Moscow: Russian Academy of Sciences.

Renou, L. and J. Filliozat 1985. *L'Inde Classique* (Manuel des études indiennes). Paris: École Française d'Extrême Orient (two volumes).

Rets, K.I. 2004. Poyasnye plastiny so stsenoy okhoty na kabana iz Sibirskoy kollektsii Petra I: k voprosu o khronologicheskoy i kulturnoy atributsii, in V.Yu. Zuev (ed.) *Bosporsky fenomen: problemy khronologii i datirovki pamyatnikov. Materialy Mezhdunarodonoi nauchnoi konferentsii*: Part 2, 325–32. St. Petersburg: State Hermitage Museum.

Rezakhani, K. 2017. The Sassanians and the Sistanis, in K. Rezakhani *ReOrienting the Sasanians: East Iran in Late Antiquity*: 27–45. Edinburgh: Edinburgh University Press.

Rhi, C.S. 1992. Maoqinggou-Kultur und ihre Zeitstellung, in G. Tian and S. Guo (eds) *Maoqinggou: ein eisenzeitliches Gräberfeld in der Ordos-Region (Innere Mongolei)* (MAVA 50): 28–45. Mainz am Rhein: Philipp von Zabern.

Riboud, K. 1971. New Soviet finds at Oglakhty and their analogy to Aurel Stein textiles – Han period. *Bulletin de CIETA* 2/34: 30–39. Lyon.

Richard, M.B. 2004. Alexander in China? Questions for Chinese archaeology, in Yang Xiaoneng (ed.) *New Perspectives on China's Past. Chinese Archaeology in the Twentieth Century*: 329–43. New Haven: Yale University Press.

Richardson, N. 2017. At the British Museum. *London Review of Books* (19th October): 36–37.

Rieth, A. 1971. Scythische Schildzeichen. *Prähistorische Zeitschrift* 46: 111–25.

Ringgaard, M.G. and A. Bruselius Scharff 2010. The Impact of Dyes and Natural Pigmentation of Wool on the Preservation of Archaeological Textiles, in E. Andersson Strand, M. Gleba, U. Mannering, C. Munkholt and M. Ringgaard (eds) *North European Symposium for Archaeological Textiles* 10: 221–24. Oxford: Oxbow.

Roaf, M. 1974. The subject peoples on the base of the statue of Darius. *Cahiers de la Délégation Archéologique Française en Iran* 4: 73–160.

Roaf, M. 1984. Excavations at Tell Mohammed 'Arab in the Eski Mosul Dam Salvage Project. *Iraq* 46 (autumn): 141–56, pls X–XIII.

Roberts, C. and K. Manchester 2005. *The Archaeology of Disease*. Cornell: Cornell University Press (third edition).

Rockhill, W.W. 1900. *The Journey of William of Rubruck to the Eastern Parts of the World*. London: Hakluyt Society.

Rogov, E.Ya. and I.V. Tunkina 1998. Raspisnaya i chernolakovaya keramika iz nekropolya Panskoe I. *Arkheologicheskie vesti* 1998/5: 159–75.

Rogozhinsky, A.E. 2016. Nezadolgo do Chzhan Tsyanya: sled dvizhenia nomadov iz tsentra Azii na Zapad v poslednie veka do nashei ery, in A.P. Derevyanko and V.I. Molodin (eds) *Altai v krugu evraziiskih drevnostei*: 527–50. Novosibirsk: Institute of the Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Rolle, R. 1989. *The World of the Scythians*. Berkeley and London: University of California Press and B.T. Batsford.

Rolle, R. 2011. The Scythians: Between Mobility, Tomb Architecture, and Early Urban Structures, in L. Bonfante (ed.) *The Barbarians of Ancient Europe: Realities and Interactions*: 107–31. Cambridge: Cambridge University Press.

Rolle, R., V.J. Murzin and A.Yu. Alekseev 1998. *Königskurgan Čertomlyk. Ein skythischer Grabhügel des 4. vorchristlichen Jahrhunderts*. Mainz am Rhein: Philipp von Zabern.

Rolle, R., V. Murzhin and B. Shramko 1996. The Castle Wall System of Bel'sk. *Hamburg Contributions to Archaeology* 18: 57–84.

Romashko, V.A. and V.A. Skory 2009. *Bliznets-2: skifskij aristokraticheskij kurgan v Dnepronskom pravoberezhnom nadporozhye*. Dnepropetrovsk: Porogi.

Root, M.C. 1979. *King and Kingship in Achaemenid Art*. Leiden: E.J. Brill.

Root, M.C. 2011. Elam in the Imperial Imagination: From Nineveh to Persepolis, in J. Álvarez-Mon and M.B. Garrison (eds) *Elam and Persia*: 419–74. Winona Lake (IN): Eisenbrauns.

Rose, J. 2001. Sasanian Splendor: The Appurtenances of Royalty, in S. Gordon (ed.) *Robes and Honor. The Medieval World of Investiture*: 35–58. New York: Palgrave-Macmillan.

Rosen, S. 1993. A Roman Period Pastoral Tent Camp in the Negev, Israel. *Journal of Field Archaeology* 204 (winter): 441–51.

Rosen, S. 2017. *Revolutions in the Desert: The Rise of Mobile Pastoralism in the Southern Levant*. New York: Routledge.

Ross, E.D. 1943. *Both Ends of the Candle: the autobiography of Sir E. Denison Ross*. London: Faber and Faber.

Rossi-Osmida, G. (ed.) 2002. *Margiana Gonur-depe Necropolis. 10 Years of Excavations by Ligabue Study and Research Centre*. Padua: Il Punto Edizioni.

Rostovtseff, M.I. 1912. Piksida raspisnogo sklepa kurgana Vasyurinoy gory. *Zapiski Odesskogo obshchestva istorii i drevnostey* 30: 136–50.

Rostovtseff, M.I. 1913/14. *Antichnaya dekorativnaya zhivopis na yuge Rossii*. St. Petersburg: Imperial Archaeological Commission.

Rostovtseff, M.I. 1914. Voronezhsky serebryany sosud, in *Materialy i issledovanija po arkheologii Rossii* 34: 79–93. Petrograd: Typography of General Directorate, Head administration of *udels*.

Rostovtseff, M.I. 1918. Kurgannye nakhodki Orenburgskoy oblasti epokhi rannego i pozdnego ellinizma. *Materialy po arkheologii Rossii* 37. Petrograd: Ninth State Printing House.

Rostovtseff, M.I. 1922. *Iranians and Greeks in South Russia*. Oxford: The Clarendon Press.

Rostovtseff, M.I. 1925. *Skifiya i Bospor. Kriticheskoe obozrenie pamyatnikov literaturnykh i arkheologicheskikh.* Leningrad: Institute of Archaeology, Soviet Academy of Sciences.

Rostovtseff, M.I. 1926/93. Sarmatskiye i indo–skifskiye drevnosti. *Peterburgskiy arkheologicheskiy vestnik. Pervoye izdaniye: Sbornik statey. posvyashchennykh pamyati N.P. Kondakova. Seminarium Kondakovianum* 5: 39–56.

Rothschild, B.M., D.H. Tanke, M. Helbling and L.D. Martin 2003. Epidemiologic study of tumors in dinosaurs. *Naturwissenschaften* 90/11 (November): 495–500.

Rouse, L.M. 2015. A line in the sand: Archaeological evidence for the interaction of settled farmers and mobile pastoralists in the Late Bronze Age (1950–1500 BC) Murghab alluvial fan, Turkmenistan. Unpublished PhD dissertation, Graduate School of Arts and Sciences of Washington University, St. Louis, Missouri.

Rouse, L.M. and B. Cerasetti 2014. Ojakly: A Late Bronze Age mobile pastoralist site in the Murghab Region, Turkmenistan. *Journal of Field Archaeology* 39/1: 32–50.

Roux, V. and P. Matarasso 1999. Les perles de cornaline harrapéennes: données ethnoarchéologiques, in A. Caubet (ed.) *Cornaline et Pierres Précieuses. La Méditerranée, de l'Antiquité à l'Islam*: 174. Paris: Musée du Louvre and La documentation française.

Roux, V. and J. Pelegrin 1989. Taille des perles et spécialisation artisanale. Enquête ethnoarchéologique dans le Gujarat. *Techniques et Culture* 14: 23–49.

Rowland, B. 1946. Gandhāra and Early Christian Art: the *Homme-Arcade* and the Date of the Bimaran Reliquary. *The Art Bulletin* 28/1: 44–47.

Rudenko, S.I. 1931. 'Skifskoye' pogrebeniye vostochnogo Altaia. *Reports of GAIMK* 2: 25–61.

Rudenko, S.I. 1953. *Kultura naseleniya gornogo Altaya v skifskoye vremya*. Moscow and Leningrad: Soviet Academy of Sciences.

Rudenko, S.I. 1958. The Mythological Eagle, the Gryphon, the Winged Lion in the Art of Northern Nomads. *Artibus Asiae* 21/2: 101–22.

Rudenko, S.I. 1960. *Kultura naseleniya Tsentralnogo Altaya v skifskoe vremya*. Moscow and Leningrad: Soviet Academy of Sciences.

Rudenko, S.I. 1962*a*. *Kultura gunnov i noinulinskiye kurgany*. Moscow and Leningrad: Soviet Academy of Sciences (published in translation, 1969).

Rudenko, S.I. 1962*b*. Sibirskaya kollektsiya Petra I. *Arkheologiya SSSR. Svod arkheologicheskikh istochnikov*: 3–9. Moscow and Leningrad: Soviet Academy of Sciences.

Rudenko, S.I. 1968. *Drevneyshie v mire khudozhestvennye kovry i tkani*. Moscow: 'Artiya'.

Rudenko, S.I. 1969. *Die Kultur der Hsiung-Nu und die Hügelgräber von Noin Ula*. Bonn: Rudolf Habelt (translated reprint of Rudenko 1962*a*).

Rudenko, S.I. 1970. *Frozen Tombs of Siberia: The Pazyryk Burials of Iron Age Horsemen*. London and Berkeley: J.M. Dent and Sons Ltd and University of California Press (translated by M.W. Thompson).

Ruev, V.L. 2011. Nakonechniki osmanskikh strel po rezul'tatam issledovaniya ukrepleniya No. 14 glavnoy linii oborony Mangupa v 2007 g. *Uchenyye zapiski Tavricheskogo natsional'-nogo universiteta im. V.I. Vernadskogo (Istoricheskiye nauka)* 24 (63)/1: 109–26.

Rung, E. and O. Gabelko 2018. The Scythian Expedition of Darius I and the Old Persian Inscription for Phanagoreia. *Vestnik drevnei istorii* 78/4: 847-69.

Runnels, C. 1995. Environmental Degradation in Ancient Greece. *Scientific American* 272/3 (March): 96–99.

Rusakova, I.D. 2016. Predvaritelnye rezultaty obsledovaniya petroglifov Boyarskogo khrebta v 2011–2014 g., in O.S. Sovetova (ed.) *Arkheologiya Yuzhnoy Sibiri* 27: 101–14. Kemerovo.

Rush, A. 1996. Professor Sir Harold Bailey. *The Independent* 12th January: 12.

Russell, J.R. 1983. Review of H.W. Bailey, *The Culture of the Sakas in Ancient Iranian Khotan*. *Iran-Nameh* 1: 678–85.

Russell, J.R. 2004. On mysticism and esotericism among the Zoroastrians. *Armenian and Iranian Studies:* 531-52. Cambridge (MA): NELC, Harvard-NAASR.

Ryabkova, T.V. 2010. Klassifikatsia izobrazheniy s rombovidnymi znakami na predmetakh predskifskogo i ranneskifskogo vremeni, in M.B. Muzhokhoev (ed.) *Problemy khronologii i periodizatsii arkheologicheskikh pamyatnikov i kultur severnogo Kavkaza: Tezisy dokladov*: 309–12. Magas: Piligrim.

Ryabkova, T.V. 2014*a*. Izdeliya s peregorodchatoy inkrustatsiey v predskifskikh i ranneskifskikh pamyatnikakh, in *Trudy IV (XX) Vserossiyskogo arkheologicheskogo syezda v Kazani*: vol. II, 163–68. Kazan: 'Otechestvo'.

Ryabkova, T.V. 2014*b*. Kurgan 524 u s. Zhabotin v sisteme pamyatnikov perioda skifskoy arkhaiki. *Rossiysky arkheologichesky ezhegodnik* 4: 236–77. St. Petersburg: 'University Publishing Consortium'.

Ryabkova, T.V. 2014*c*. Tri kostyanykh psaliya iz Prikubanya v kollektsii Ermitazha. *Archaeological News* 20: 205–16. St. Petersburg: 'Art-Express'.

Ryabkova, T.V. 2015. Poseleniye Tarasova Balka - pamyatnik rannego zheleznogo veka v Zakubanye (predvaritelnaya publikatsiya). *Transactions of the State Hermitage* 77: 359–74. St. Petersburg: State Hermitage Publishing.

Ryabkova, T.V. 2016. Navershiya s sharovidnymi proreznymi bubentsami iz ranneskifskikh pamyatnikov Zakubanya, in A.S. Balakhvantsev and S.V. Kullanda (eds) *Kavkaz i step na rubezhe epokhi bronzy i rannego zheleza*: 215–21. Moscow: Russian Academy of Sciences Institute of Eastern Studies.

Ryabkova, T.V. and E.Yu. Loginova 2013. Keramichesky compleks Kostromskogo (1-ogo Razmennogo) kurgana (predvaritelnaya publikatsiya). *Shestaya mezhdunarodnaya kubanskaya arkheologicheskaya konferentsiya*: 370–74. Krasnodar: Ekoinvest.

Sahlins, M. 1963. Poor Man, Rich Man, Big-Man, Chief: Political Types in Melanesia and Polynesia. *Comparative Studies in Society and History* 5/3: 285–303.

Sajjadi, S.M.S. 2007. Wall Painting from Dahaneh-ye Gholaman (Sistan). *Ancient Civilizations from Scythia to Siberia* 13/1–2: 129–54.

Salmony, A. 1933. *Sino-Siberian Art in the Collection of C.T. Loo*. Paris: C.T. Loo.

Salzman, P.C. 2002. Pastoral nomads: some general observations based on research in Iran. *Journal of Anthropological Research* 58: 245–64.

Samashev, Z.S. 2007. Die Fürstengräber von Berel, in W. Menghin (ed.) *Im Zeichen des goldenen Greifen. Königsgräber der Skythen*: 132–38. Munich / Berlin / London / New York: Prestel.

Samashev, Z.S. 2012. The Berel kurgans: some results of investigation, in S. Stark, K.S. Rubinson, Z. Samashev and J.Y. Chi (eds) *Nomads and Networks. The Ancient Art and Culture of Kazakhstan*: 31–49. New York and Princeton: Institute for the Study of the Ancient World and Princeton University Press.

Samashev, Z. and V. Mylnikov 2004. *Woodworking of Ancient Cattle-Breeders of Kazakh Altai. Materials of Complex Analysis of Wooden Objects from Barrow 11 of Berel Burial Ground*. Almaty: ExxonMobil.

Samashev, Z.S., A.S. Ermolaeva and T.M. Teplovodskaya 1999. Poseleniye Toksanbay na Ustyurte. *Izvestiya Ministerstva nauki i vyshego obrazovaniya Respubliki Kazakhstan, Natsional'noy Akademii Nauk Respubliki Kazakhstan, Seriya obshchestvennykh nauk* 1 (219): 49–69.

Samashev, Z.S., H.-P. Francfort, A.S. Ermolaeva, G.S. Zhumabekova, E. Gij, S. Sungataj, Zh.M. Zhetybaev and G.K. Omarov 1998. Issledovanie kultury drevnykh kochevnikov kazakhstanskogo Altaya, in A.T. Toleubaev (ed.) *Problemy izucheniya i sokhraneniya istoricheskogo naslediya*: 174–202. Almaty: Almaty University.

Samashev, Z.S., G.A. Bazarbaeva and G.S. Zhumabekova 2002. Die 'goldhütenden greife' des Herodot und die archäologische Kultur der Früheren Nomaden im Kazachischen Altai. Skythenzeit-liche Kurgane von Berel und Tar-Asu. *Eurasia Antiqua* 8: 237–77.

Samashev, Z.S., G.A. Bazarbaeva, G.S. Zhumabekova and H.-P. Francfort 2000*a*. Le kourgane de Berel' dans l'Altaï kazakhstanais. *Arts Asiatiques* 55: 5–20.

Samashev, Z.S., G.A. Bazarbaeva, G.S. Zhumabekova and S. Sungataj 2000*b*. *Berel*. Almaty: Fond Berel.

Samashev, Z., A. Nagler, H. Parzinger and M. Navrot 2009. Sovmestnyye germansko-kazakhskie issledovaniya bolshih sakskih kurganov Semirechya, in N.Yu. Limberis (ed.) *Piataya Kubanskaya arkheologicheskaya konferentsiya: Materialy konferentsii*: 350–52. Krasnodar: Kuban State University.

Samolin, W. 1964. *East Turkistan to the Twelfth Century: a brief political survey*. The Hague: Mouton and Co.

Sancisi-Weerdenburg, H. 1983. Exit Atossa: Images of Women in Greek Historiography on Persia, in A. Cameron and A. Kuhrt (eds) *Images of Women in Antiquity*: 20–33. London: Routledge.

Sancisi-Weerdenburg, H. 1995. Persian Food: Stereotypes and Political Identity, in J. Wilkins (ed.) *Food in Antiquity*: 286–302. Exeter: Exeter University Press.

Sancisi-Weerdenburg, H. 1998. Baji, in M. Brosius and A. Kuhrt (eds) *Studies in Persian History: Essays in Memory of David M. Lewis* (Achaemenid History 11): 22-34. Leiden: Nederlands Instituut voor het Nabije Oosten.

Sankalia, H.D. 1970. *Some Aspects of Prehistoric Technology in India*. New Delhi: National Academy of Sciences.

Sargent, R.A. and D.K. Ousterhout 1983. Ocular manifestations of skeletal disease, in R.D. Harley (ed.) *Pediatric Ophthalmology*: 1030–52. London: W.B. Saunders (second edition).

Sarianidi, V.I. 1985. *L'or de la Bactriane. Fouilles de la nécropole de Tillia-tepe en Afghanistan septentrional / Bactrian Gold. Excavations of the Tillya-tepe cemetery in northern Afghanistan*. Leningrad: Aurora.

Sarianidi, V.I. 1989. *Khram i nekropol' Tillyatepe*. Moscow: Russian Academy of Sciences.

Sarianidi, V.I. 1990*a*. *Drevnosti strany Margush*. Ashgabat: 'Ilym'.

Sarianidi, V.I. 1990*b*. The Golden Hoard of Bactria. *National Geographic* 177/3 (March): 50–75.

Sarianidi, V.I. 1998. *Margiana and Protozoroastrism*. Athens: Kapon.

Sarianidi, V.I. 2001. *Nekropol' Gonura i iranskoye yazychestvo*. Moscow: 'Mir' media.

Sarianidi, V.I. 2002. *Margush. Drevnevostochkoye tsarstvo v staroy del'te reki Murgab / Margush. Ancient Oriental Kingdom in the Old Delta of the Murghab river / Marguş. Murgap deŕyasynyń aýagyndaky gadymy gündogar şalygy*. Aşgabat: Türkmen döwlethabarlary.

Sarianidi, V.I. 2005. *Gonur-Depe. Gorod tsarey i bogov / Goňurdepe. City of Kings and Gods / Goňurdepe. Şalaryň we hudaýlaryň şäheri*. Aşgabat: Miras.

Sarianidi, V.I. 2007. *Necropolis of Gonur*. Athens: Kapon.

Sarianidi, V.I. 2009. *Margush. Tayna t pravda velikoy kultury / Margush. Mystery and truth of the great culture / Marguş*. Beýik medeniýetiň syrlar dünýäsi we onuň kakyky keşbi. Aşgabat: Türkmen döwlet neşirýat gullugy.

Sarianidi, V.I. 2011. Tillya Tepe, the Hill of Gold: A Nomad Necropolis, in F. Hiebert and P. Cambon (eds) *Afghanistan. Crossroads of the Ancient World*: 219–31. London: British Museum Press.

Sarianidi, V.I. and G.A. Koshelenko 1982. Monety iz raskopok nekropolja, raspoložennogo na gorodišče Tillja-tepe, in G.M. Bongard-Levin (ed.) *Drevnyaya Indiya. Istoriko-kulturnye svyazi*: 307–18. Moscow: 'Oriental Literature', Russian Academy of Sciences.

Sarre, F. 1921. *L'art de la Perse ancienne*. Paris: G. Crès and Cie (translated by P. Budry).

Sass, B. 2000. Matchlocks, Flintlocks, and Saltpetre: The Chronological Implications for the Use of Matchlock Muskets among Ottoman-Period Bedouin in the Southern Levant. *International Journal of Historical Archaeology* 4/3 (September): 191–216.

Satlow, M. (ed.) 2013. *The Gift in Antiquity*. Oxford: Oxford University Press.

Savage-Landor, A.H. 1902. *Across Coveted Lands: A Journey from Flushing (Holland) to Calcutta Overland*. London: Macmillan.

Savenkov, I.T. 1910. O drevnih pamyatnikah izobrazitelnogo iskusstva na Enisee. Sravnitelnye arkheologo-etnograficheskie ocherki, in *Trudy XIV Arkheologicheskogo sezda v Chernigove*: vol. 1, 119–31. Moscow: Typography of G. Lissner and D. Sobko.

Savinov, D.G. 1995. Tesinskie 'labirinty' (po materialam mogilnika Esino III, in V.V. Bobrov (ed.) *Drevnee iskusstvo Azii. Petroglify*: 22–32. Kemerovo: Kemerovo State University.

Savinov, D.G. 2002. *Ranniye kochevniki Verkhnego Eniseya. Arkheologicheskiye kultury i culturogenez.* St. Petersburg: St. Petersburg State University Press.

Savinov, D.G. 2009. *Minusinskaya provintsiya khunnu (po materialam arkheologicheskikh issledovaniy 1984–1989 gg.)*. St. Petersburg: Institute for the History of Material Culture and St. Petersburg State University.

Savinov, D.G. 2012. Izobrazitel'nye pamyatniki ranneskifskogo vremeni: iskusstvo kompozitsii, in O.S. Sovetova and G.G. Korol (eds) *Izobrazitel'nye i tekhnologicheskie traditsii v iskusstve Severnoy i Tsentral'noy Azii* (Trudy Sibirskoi Assotsiastii Issledovatelei Pervobytnogo Iskusstva) 9: 35–55. Moscow and Kemerovo: Kuzbassvuzizdat.

Savinov, D.G. and M.L. Podolsky (eds) 1997. *Okunevsky sbornik-2. Kultura i ee okruzheniye*. St. Petersburg: Petro Rif.

Sax, M. 1996. Recognition and Nomenclature of Quartz Materials with specific reference to Engraved Gemstones. *Jewellery Studies* 7: 63–72.

Schaefer, H. 1943. Hellenistic Textiles in Northern Mongolia. *American Journal of Archaeology* 47/3: 266–77.

Schiltz, V. 1994. *Les Scythes et les nomades des steppes. 8e siècle avant J.-C. 1er siècle après J.-C.* (L'univers des formes). Paris: Gallimard.

Schiltz, V. 1999. Tilla tepe en Bactriane, in P. Chuvin (ed.) *Les arts de l'asie centrale*: 70–71. Paris: Citadelles et Mazenod.

Schiltz, V. 2006. Tillia tepe, la 'Colline de l'or', une nécropole nomade, in P. Cambon and J.-F. Jarrige (eds) *Afghanistan, les trésors retrouvés. Collections du musée national de Kaboul*: 69–79, 270–83. Paris: Éditions du Réunion des musées nationaux.

Schiltz, V. 2012. Le coeur and le lierre, une expression du pouvoir à Tillia Tépé, in V. Lefèvre (ed.) *Orientalismes. De l'archéologie au musée. Mélanges offerts à Jean-François Jarrige* (Indicopleustoi 9): 335–53. Turnhout: Brepols.

Schimmelpfennig, M. and G. Kossack 1992. Datierung durch die Ausgräber, in Tian Guangjin and Guo Suxin (eds) *Maoqinggou: ein eisenzeitliches Gräberfeld in der Ordos-Region (Innere Mongolei)* (MAVA 50): 15–28. Mainz am Rhein: Philipp von Zabern.

Schlumberger, D. 1971. La coiffure du Grand roi. *Syria* 48/1–2: 375–83.

Schmidt, E.E. 1953. *Persepolis I: Structures, Reliefs, Inscriptions* (Oriental Institute Publications 68). Chicago: The Oriental Institute, University of Chicago.

Schmidt, E.E. 1957. *Persepolis II: Contents of the Treasury and Other Discoveries* (Oriental Institute Publications 69). Chicago: The Oriental Institute, University of Chicago.

Schmidt, P., L. Bellot-Gurlet, A. Slodczyk and F. Fröhlich 2012. A hitherto unrecognised band in the Raman spectra of silica rocks: influence of hydroxylated Si–O bonds (silanole) on the Raman moganite band in chalcedony and flint (SiO2). *Physics and Chemistry of Minerals* 39/6: 455–64.

Schmidt, P., L. Bellot-Gurlet, V. Léa and P. Sciau 2013. Moganite detection in silica rocks using Raman and infrared spectroscopy. *European Journal of Mineralogy* 25/5: 797–805.

Schmitt, R. 1990. Candys, in E. Yarshater (ed.) *Encyclopaedia Iranica* 4/7: 757–58.

Schmitt, R. 1991. *The Bisitun Inscriptions of Darius the Great: Old Persian text* (Corpus Inscriptionum Iranicarum I.I). London: School of Oriental and African Studies.

Schmitt, R. 2000. *The Old Persian Inscriptions of Naqsh-i Rustam and Persepolis* (Corpus Inscriptionum Iranicarum I.II). London: School of Oriental and African Studies.

Schmitt, R. 2002. Greece xii. Persian Loanwords and Names in Greek, in E. Yarshater (ed.) *Encyclopaedia Iranica* 11/4: 357–60.

Schmitt, R. 2004. Haumavargā, in E. Yarshater (ed.) *Encyclopædia Iranica* 12: 63-64.

Schmitt, R. 2018. Scythian language, in E. Yarshater (ed.) *Encyclopaedia Iranica*, accessed 10th April 2018, <http://www.iranicaonline.org/articles/ scythian-language>.

Schopen, G. 1997. *Bones, Stones, and Buddhist Monks. Collected papers on the archaeology, epigraphy, and texts of monastic Buddhism in India* (Studies in the Buddhist traditions). Honolulu: University of Hawai'i Press.

Schorta, R. 2001. A group of Central Asia woolen textiles in the Abegg-Stiftung collection, in D. Keller and R. Schorta (eds) *Fabulous Creatures from the Desert Sand. Central Asian Woolen Textiles from the Second Century BC to the Second Century AD* (Riggisberger Berichte 10): 79–114. Riggisberg: Abegg Stiftung.

Schultz, M., H. Parzinger, D.V. Posdnjakov, T.A. Chikisheva and T.H. Schmidt-Schultz 2007. Oldest known case of metastasizing prostate carcinoma diagnosed in the skeleton of a 2,700-year-old Scythian king from Arzhan (Siberia, Russia). *International Journal of Cancer* 121/12 (December): 2591–95.

Schulz, P.N. 1976. Skifskie izvayaniya, in I.B. Brashinsky (ed.) *Khudozhestvennaya kultura i arkheologiya antichnogo mira*: 218–31. Moscow: Russian Academy of Sciences.

Schweppe, H. 1989. Identification of Red Madder and Insect Dyes by Thin-Layer Chromatography, in S. Haig Zeronian and H.L. Needles (eds) *Historic Textile and Paper Materials. II, Conservation and Characterization of Textiles* (American Chemical Society Symposium Series 410): 188–219. Washington: American Chemical Society.

Scott, J.C. 2017. *Against the Grain*. New Haven: Yale University Press.

Sdykov, M.N. and Ya. Lukpanova 2013. *Rannie kochevniki Zapadnogo Kazakhstana (na primere komplexa Taksai I)*. Ural'sk: Poligrafservis.

Seifert, M. and I.Ju. Slyusarenko 1996. Dendrochronologische Daten von Gräbern der Pazyryk-Kultur (5./4/ Jh. v. Chr.) im Altai. *Dendrochronologia* 14: 153–64.

Sekerskaya, E.L. 1992. *Analiz ostatkov loshadey iz kurganov skifskoy znati. Drevnosti Severnogo Prichernomor'ya i Kryma* 3: 187–91.

Sekunda, N.V. 2010. Changes in Achaemenid Royal Dress, in J. Curtis and St J. Simpson (eds) *The World of Achaemenid Persia. History, Art and Society in Iran and the Ancient Near East*: 256–72. London: I.B. Tauris.

Selbitschka, A. 2010. *Prestigegüter entlang der Seidenstraße? Archäologische und historische Untersuchungen zu Chinas Beziehungen zu Kulturen des Tarimbeckens vom zweiten bis frühen fünften Jahrhundert nach Christus* (Asiatische Forschungen 154). Wiesbaden: Harrassowitz.

Semyonov, V.A. 1979. Arkheologicheskiye pamyatniki kontsa 1 tys. do n.e. v Sayanskom kanyone Eniseya, in A.I. Martynov (ed.) *Problemy skifo-sibirskogo kulturno-istoricheskogo edinstva. Tezisy dokladov vsesoyuznoy arkheologicheskoy konferentsii*: 87–89. Kemerovo: Kemerovo State University.

Sergatskov, I.V. 2000. Final rannesarmatskoy kultury: khronologiya i problemy yetnicheskoy istorii sarmatov na rubezhe er, in *Rannesarmatskaya kultura: formirovanie, razvitie, khronologiya. Materialy IV mezhdunarodnoy konferentsii 'Problemy sarmatskoj arkheologii i istorii'*: vol. I, 150–57. Samara: SNC RAN.

Serruys, H. 1974. Mongol 'Qorii': reservation. *Mongolian Studies* 1: 76–91.

Sevin, V. 1988. The Oldest Highway between the Regions of Van and Elazig in Eastern Anatolia. *Antiquity* 62/236: 547–51.

Shaanxi Sheng Qinyong Kaogudui 1991. Qin Shihuang ling yihao tong chema qingli jianbao [Brief report on the excavation of bronze chariot no. 1 from the mausoleum of the First Emperor of Qin]. *Wenwu* 1: 1–13.

Shaanxi Sheng Kaogu Yanjiusuo 2004. *Qindu Xianyang kaogu baogao* [*Archaeological report on the investigations and excavations at the ancient Qin captial of Xianyang*]. Beijing: Kexue chubanshe.

Shaanxi Sheng Kaogu Yanjiuyuan, Baoji Shi Wenwu Luyouju 2014. *Zhouye luming: Baoji Shigushan Xi Zhou guizu mu chutu qingtongqi* [*Noble life of the Zhou: bronzes unearthed from the cemetery of the Western Zhou aristocrats at Shigushan of Baoji*]. Shanghai: Shanghai shuhua chubanshe.

Shablavina, E.A. 2015. Tekhnichesky osmotr metallicheskikh predmetov iz mogilnika Taksai-I, kurgana 6, in M.N. Sdykov (ed.) *Voprosy istorii i arkheologii Zapadnogo Kazakhstana* 2: 226–34. Uralsk: Poligrafservis.

Shao Anding, Mei Jianjun, Yang Junchang, Chen Kunlong and Sun Weigang 2014. Qin Shihuangdi lingyuan chutu qingtong shuiqin de buzhui gongyi ji xiangguan wenti chutan [The patch-repairing technique of the bronze waterfowls unearthed in the precinct of Emperor Qinshihuang's mausoleum site and a preliminary study on the relevant issues]. *Kaogu* 7: 96–104.

Shaverbi, E. 2019. An Inscription of Darius I from Phanagoria (DFa): Preliminary report of a work in progress. *ARTA* 5: 1–15.

Shcheglov, A.N. 1990. Severopontiiskay torgovlya hlebom vo vtoroi polovine VII–V vv. do n.e.: pis'mennye istochniki i arkeologiya, in O.D. Lordkipanidze (ed.) *Prichemomor'e VII–V vv. do n.e.*: 99–121. Tbilisi: Metsniereba.

Shelach-Lavi, G. 2014. Steppe Land Interactions and Their Effects on Chinese Cultures during the Second and Early First Millennia BCE, in R. Amitai and M. Biran (eds) *Nomads as Agents of Cultural Change: The Mongols and Their Eurasian Predecessors*: 10–31. Honolulu: University of Hawai'i Press.

Sheldon, J. 2002. Harold Walter Bailey, in E. Yarshater (ed.) *Encyclopaedia Iranica*, accessed 25th April 2018, <http://www.iranicaonline. org/articles/ bailey-harold-walter-1>.

Shemakhanskaya, M.S. 2015. *Metally i veshchi. Istoriya. Svoystva. Razrusheniye. Restavratsiya.* Moscow: 'Indrik'.

Shemakhanskaya, M., M. Treister and L. Yablonsky 2009. The technique of gold inlaid decoration on the 5th–4th centuries BC silver and iron finds from the early Sarmatian barrows of Filippovka, Southern Urals. *ArcheoSciences, revue d`archéométrie* 33: 211–20.

Sher, Ya.A. 1980. *Petroglify Srednej i Central'noj Azii*. Moscow: Russian Academy of Sciences.

Sher, Ya.A. 1992. A propos des origines du 'style animalier'. *Arts Asiatiques* 47: 5–18.

Sher, Ya.A. 1993. 'Gospodin konej' na beregu Eniseja, in M.B. Schukin (ed.) *Skify. Sarmaty. Slavjane. Rus'* (Peterburgskiy arkheologicheskij vestnik) 6: 17–22. St. Petersburg: 'Farn'.

Sher, Ya.A. 1998. O vozmozhnykh istokakh skifo-sibirskogo zverinogo stilya. *Voprosy arkheologii Kazakhstana* 1998/2: 218–30. Almaty and Moscow: Gylym.

Sher, Ya.A. 2000. O datirovke kurgana Arzhan i o nekotoryh bolee obschih voprosah. *Vestnik Sibirskoi assotsiastii issledovatelei pervobytnogo iskusstva* 2: 25–29.

Sher, Ya.A., N. Blednova, N. Legchilo and D. Smirnov 1994. *Oglakhty I–III (Russie, Khakassie)* (Répertoire des pétroglyphes d'Asie Centrale, fascicule 1: Siberie du Sud 1). Paris: de Boccard.

Sherratt, A. 1981. Plough and pastoralism: aspects of the secondary products revolution, in I. Hodder, G. Isaac and N. Hammond (eds) *Pattern of the past. Studies in honour of David Clarke*: 261–305. Cambridge: Cambridge University Press.

Shevchenko, N.F. 2011. Stepi Prikubanya i siraki v IV–III vv. do n.e. *Istoriko-arkheologicheskij almanakh* 10: 44–57. Armavir and Krasnodar.

Shirin, Yu.V. 2003. *Verkhnee Priobye i predgorya Kuznetskogo Alatau v nachale 1 tysyacheletiya n.e. (pogrebalniye pamyatniki fominskoy kultury)*. Novokuznetsk: 'Kuznetsk Fortress'.

Shishegar, A. 2015. *Tomb of the Two Elamite Princesses of The House of King Shutur-Nahunte son of Indada, Neo-Elamite Period, Phase IIIB (ca. 585–539 B.C.)*. Tehran: Iranian Cultural Heritage and Tourism Organisation.

Shishlina, N.I. and F.T. Hiebert 1998. The steppe and the sown. Interaction between Bronze Age and Early Iron Age nomads and agriculturalists, in V.H. Mair (ed.) *The Bronze Age and Early Iron Age Peoples of eastern Central Asia* (Journal of Indo-European Studies Monograph 26): 222–37. Washington D.C.: Journal of Indo-European Studies.

Shishlina, N., S. Pankova, V. Sevastyanov, O. Kuznetsova and Yu. Demidenko 2016. Pastoralists and mobility in the Oglakhty cemetery of southern Siberia: new evidence from stable isotopes. *Antiquity* 90/351: 679–94.

Shishlina, N.I., J. Van der Plicht, R.E.M. Hedges, E.P. Zazovskaya, V.S. Sevastyanov and O.A. Chichagova 2007. The Catacomb cultures of the north-west Caspian steppe: 14C chronology, reservoir effect, and paleodiet. *Radiocarbon* 49: 713–26.

Shramko, B.A. 1984. Iz istorii skifskogo vooruzheniya, in E.V. Chernenko (ed.) *Vooruzhenie skifov i sarmatov*: 22–38. Kiev: 'Naukova Dumka'.

Shramko, B.A. 1987. *Bel'skoe gorodische skifskoi epohi (gorod Gelon)*. Kiev: 'Naukova Dumka'.

Shramko, B.A. and Z.V. Yanushevich 1985. Kulturnye rasteniya Skifii. *Sovetskaya arkheologiya* 1985/2: 47–64.

Shramko, I.B. 1992. Ob odnom tipe mechey skifskoy epokhi, in V.K. Mikheev (ed.) *Istoriya i arkheologiya Slobodskoy Ukrainy*: 221–23. Kharkov: Kharkov State University.

Shulga, P.I. 2008. *Snaryazheniye verkhovoy loshadi i voinskiye poyasa na Altaye, 1: ranneskifskoye vremya*. Barnaul: Azbuka.

Shulga, P.I. 2010. *Sintszyan v VIII–III vv. do n.e. (Pogrebalniye kompleksy. Khronologiya i periodizatsiya)*. Barnaul: Altai State University Press.

Shulga, P.I. 2011. Osobennosti etnokulturnykh protsessov na territorii Sintszyana (Kitay) v VIII–III vv. do n.e., in N.A. Makarov and E.N. Nosov (eds) *Trudy III (XIX) Arkheologicheskogo syezda*: vol. 1, 407–408. St. Petersburg / Moscow / Veliky Novgorod: 'Novgorod technopark'.

Shulga, P.I. 2013*a*. Osobennosti ugasaniya i transformatsii ranneskifskikh kultur v VI v. do n.e. na vostoke Evrazii (k postanovke problemy). *Vestnik Tomskogo gosudarstvennogo universiteta* 3/23: 319–23.

Shulga, P.I. 2013*b*. Mogilnik Yuhuangmiao i kochevnicheskie kultury Yuzhnoy Sibiri. *Problemy arkheologii, etnografii, antropologii Sibiri i sopredelnykh territoriy* 19: 382–86. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Shulga, P.I. 2013*c*. Kharakteristike kamenskoy kultury, in *Voprosy arkheologii i istorii Yuga Zapadnoj Sibiri*: 161–73. Barnaul: Altai State Pedagogical University.

Shulga, P.I. 2015*a*. *Skotovody Gornogo Altaya v skifskoe vremya (po materialam poselenii).* Novosibirsk: Novosobirsk State University Press.

Shulga, P.I. 2015*b*. *Mogilnik Yuhuangmiao v Severnom Kitae (VII–VI veka do nashey ery).* Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Shulga, P.I. and D.P. Shulga 2015. Mogilnik Saensai ranneskifskogo vremeni u g. Urumqi (Sintszyan, Kitay). *Trudy gosudarstvennogo Ermitazha. Arkheologiya bez granits: kollektsii, problemy, issledovaniya, gipotezy* 77: 512–33.

Shulga, P.I., D.P. Shulga and E.A. Girchenko 2014. Proiskhozhdeniye skifoidnoy kultury maozingou (Severnyy Kitay), in A.P. Derevyanko and V.I. Molodin (eds) *Problemy arkheologii, etnografii i antropologii Sibiri i sopredelnykh territoriy* 20: 321–24. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Siamak, M.N. 2018. *Jagd- und Kampfszenen auf den achämenidischen Siegeln*. Berlin: Akademiker Verlag.

Sideris, A. 2016. A Lydian Silver Amphora with Zoomorphic Handles. *Studia Hercynia* 20/1: 19–26.

Sievers, S. 1982. *Die mitteleuropäischen Hallstattdolche: Ein Beitrag zur Waffenbeigabe im Westhallstattkreis* (Kleine Schriften aus dem Vorgeschichtlichen Seminar Marburg 7). Munich: C.H. Beck.

Sievers, S. 2002. *Istoricheskiye zapiski: Shi tszi*. Moscow: 'Oriental Literature', Russian Academy of Sciences (translation by R.V. Vyatkin and A.M. Karapetyants).

Simonenko, A.V. 1991. Sarmatskie pogrebeniye s tamgami na territorii Olviskogo gosudarstava. *Arkheologia* 1991/1: 106–18.

Simonenko, A.V. 1993. *Sarmaty Tavrii*. Kiev: 'Naukova Dumka'.

Simonenko, A.V. 2000. Osobennosti rannesarmatskoj kultury Severnogo Prichernomorya. *Rannesarmatskaja kultura: formirovanie, razvitie, khronologiya. Materialy IV mezhdunarodnoy konferentsii 'Problemy sarmatskoy arkheologii i istorii'*: vol. 1, 158–66. Samara: SNC RAN.

Simonenko, A.V. 2003. 'Problema III v. do n.je.' – variant reshenija? *Nizhnevolzhskiy arkheologicheskiy vestnik* 6: 297–303.

Simonenko, A.V. 2008. Sarmatskiye katafractarii: nauchny folklor i vozmozhnosti issledovaniya. *Nizhnevolzhsky arkheologicheskiy vestnik* 9: 272–87.

Simonenko, A.V. 2010. *Sarmatskiye vsadniki Severnogo Prichernomorya*. St. Petersburg: St. Petersburg State University Press.

Simonenko, A.V. 2015. *Sarmatskie vsadniki Severnogo Prichernomoria*. Kiev: Oleg Filjuk.

Simpson, St J. 1997. Bone, ivory, and shell: Artifacts of the Persian through Roman periods, in E.M. Meyers (ed.) *The Oxford Encyclopedia of Archaeology in the Near East*: vol. 1, 343–48. New York: Oxford University Press (five volumes).

Simpson, St J. 2001. Observations on Early Iron Age beads from Luristan. *Bead Study Trust Newsletter* 36 (winter): 6–10.

Simpson, St J. 2003*a*. Sasanian Beads: the evidence of art, texts and archaeology, in I.C. Glover, H. Hughes-Brock and J. Henderson (eds) *Ornaments from the Past: Bead Studies after Beck*: 59–78. Bangkok and London: The Bead Study Trust.

Simpson, St J. 2003*b*. From Mesopotamia to Merv: reconstructing patterns of consumption in Sasanian households, in T. Potts, M. Roaf and D. Stein (eds) *Culture through Objects: Ancient Near Eastern Studies in Honour of P.R.S. Moorey*: 347–75. Oxford: Griffith Institute.

Simpson, St J. 2004. Glass and small finds from Sasanian contexts at the ancient city-site of Merv, in V.I. Nikonorov (ed.) *Tsentralnoy Azii ot Akhemenidov do Timuridov. Arkheologiya, istoriya, etnologiya, kultury. Materialy mezhdunarodnoy nauchnoy konferentsii, posvyashchennoy stoletney sobraniya Aleksandr Markovich*: 232–38. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Sciences and State Hermitage Museum.

Simpson, St J. 2005. The Royal Table, in J. Curtis and N. Tallis (eds) *Forgotten Empire. The World of Ancient Persia*: 104–11. London: British Museum Press.

Simpson, St J. 2012. *Afghanistan: Crossroads of the Ancient World*. Some recent Contributions by the British Museum to the Appreciation of and Research into Afghanistan's Cultural Heritage. *Orient* II: 91–95.

Simpson, St J. 2015. Sasanian Glassware from Mesopotamia, Gilan, and the Caucasus. *Journal of Glass Studies* 57: 77–96.

Simpson, St J. 2018. Death in Mesopotamia: archaeological evidence for funerary ritual and burial practice during the Sasanian period, in S. Gondet and E. Haerinck (eds) *L'Orient est son Jardin. Hommage à Rémy Boucharlat* (Acta Iranica 58): 425–47. Louvain: Peeters.

Simpson, St J. 2019. Nomads and monks, soldiers and sailors, farmers and fishermen: new archaeological insights into life in the Persian Gulf from late antiquity to the early medieval period, in A.A. Zolotova (ed.) *Ex oriente Lux. Collected papers to mark the 75th anniversary of Mikhail Borisovich Piotrovsky*: 288–335. St. Petersburg: State Hermitage Publishers.

Simpson, St J. forthcoming. The small finds, in D. Kennet *et al. Kadhima: excavations and surveys in the bay of Kuwait*.

Simpson, St J. and E.V. Stepanova 2017. Eating, drinking and everyday life, in St J. Simpson and S. Pankova (eds) *Scythians: warriors of ancient Siberia*: 153–63. London: Thames and Hudson.

Simpson, St J. and S. Pankova (eds) 2017. *Scythians: warriors of ancient Siberia.* London: Thames and Hudson.

Sims-Williams, N. 1999. From the Kushan-Shahs to the Arabs. New Bactrian documents dated in the

era of the Tochi inscriptions, in M. Alram and D.E. Klimburg-Salter (eds) *Coins, Art, and Chronology. Essays on the pre-Islamic History of the Indo-Iranian Borderlands*: 245–58. Vienna: Austrian Academy of Sciences.

Sims-Williams, N. 2000 [2001]-2012. *Bactrian documents from Northern Afghanistan*, vol. I: *Legal and Economic documents* (revised edition); vol. II: *Letters and Buddhist Texts*; vol. III: *Plates* (Corpus Inscriptionum Iranicarum II.VI). London: Nour Foundation.

Sims-Williams, N. 2002. The Bactrian inscription on the seal of Khiṅgila. *Silk Road Art and Archaeology* 8: 143–48.

Sims-Williams, N. and F. de Blois (with contributions by H. Falk and D. Weber) 2018. *Studies in the Chronology of the Bactrian documents from Northern Afghanistan*. Vienna: Austrian Academy of Sciences.

Sims-Williams, N. and G. Hewitt 1997. Sir Harold Bailey 1899–1996. *Bulletin of the School of Oriental and African Studies* 60: 109–16.

Sims-Williams, N., F. Grenet and A.N. Podushkin, A.N. 2007. Les plus anciens monuments de la langue sogdienne: les inscriptions de Kultobe au Kazakhstan. *Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres* 151/2 (June): 1005–34.

Sims-Williams, U. 2004. Augustus Frederic Rudolph Hoernle, in E. Yarshater (ed.) *Encyclopaedia Iranica* 12: 418–20. New York: Encyclopaedia Iranica Foundation.

Sinika, V.S. 2004. Artefakt s zoomorfnym navershiyem iz kurgana 31 mogilnika pozdneskifskogo vremeni u s. Glinoye, in D.G. Savinov (ed.) *Izobrazitelnyye pamyatniki: stil, epokha, kompozitsii. Materialy tematicheskoy nauchnoy konferentsii*: 138–42. St. Petersburg: St. Petersburg State University.

Sinitsyn, A.A. 2017. Kanaty i Mosty Greko-Persidskoj Vojny, in O.I. Gabelko, E.V. Rung, A.A. Sinitsyn and E.V. Smykov (eds) *Iranica: Iranskie Imperii i Greko-Rimskij Mir v VI v. do n.eh. – VI v. n.eh:* 137–71. Kazan: Kazan State University.

Sinor, D. 1978. The Greed of the Northern Barbarian, in L.V. Clark and P.A. Draghi (eds) *Aspects of Altaic Civilization II* (Indiana University Uralic and Altaic Series 134): 171–82. Bloomington (IN): Indiana University.

Sîrbu, V. 2004. *Les Thraces entre les Carpates, les Balkans et la Mer Noire et leurs relations avec les populations voisines (Ve s. av. J.-C. – Ier s. apr. J.-C.). Quatre conférences données à la Sorbonne*. Brăila: Istros.

Sîrbu, V. and G. Florea 1997. *Imaginar și imagine în Dacia preromană*. Brăila: Istros.

Sîrbu, V. and G. Trohani 1997. Cités et établissements fortifiés entre les Carpates Méridionales, le Danube et la mer Noire (Ve–IIIe siècles av. J.-C.), in P. Roman, S. Diamandi and M. Alexianu (eds) *The Thracian World at the Crossroads of Civilizations*: 512–39. București: Vavila Edinf SRL.

Sîrbu, V. and G. Trohani 2007. La presénce du poisson dans l'art thrace. *Ancient Civilisations and the Sea. Studia in Honorem Annorum LXX Mihaili Lazarov* (Acta Musei Varnaensis 5): 207–19. Varna.

Sircar, D.C. 1942. *Select Inscriptions bearing on Indian History and Civilization. Volume I: From the sixth century BC to the sixth century AD*. Calcutta (second edition, Delhi and Madras 1965: V.K. Publishing House).

Sircar, D.C. 1983. *Select Inscriptions bearing on Indian History and Civilization. Volume II: From the sixth to the eighteenth centuries AD*. Delhi: Motilal Banarsidass.

Sivolap, M. and O. Shelekhan 2014. Klinkova zbroya skifskogo chasu v zibranni Cherkaskogo kraeznavchogo muzeyu. *Naukovi zapiski* 21: 209–17. Kirovograd.

Skjærvø, P.O. 1987. Aśoka, iv. the legend of Aśoka and the founding of Khotan, in E. Yarshater (ed.) *Encyclopaedia Iranica* 2: 783–85. London: Routledge and Kegan Paul.

Skjærvø, P.O. 1989. Modern east Iranian languages, in R. Schmitt (ed.) *Compendium Linguarum Iranicarum*: 370–83. Wiesbaden: Ludwig Reichert.

Skjærvø, P.O. 1991. Kings of Khotan in the eighth century, in P. Bernard and F. Grenet (eds) *Histoire et cultes de l'Asie centrale préislamique: sources écrites et documents archéologique*: 255–78. Paris: Éditions du CNRS.

Skjærvø, P.O. 2002. *Khotanese manuscripts from Chinese Turkestan in the British Library: a complete catalogue with texts and translations*. (Corpus Inscriptionum Iranicarum V.VI). London: The British Library.

Skjærvø, P.O. 2003. *Khotanese manuscripts from Chinese Turkestan in the British Library* (Corpus Inscriptionum Iranicarum V.VI). London: The British Library (revised edition).

Skjærvø, P.O. 2004. Iranians, Indians, Chinese and Tibetans: the rulers and ruled of Khotan in the first millennium, in S. Whitfield and U. Sims-Williams (eds) *The Silk Road: Trade, Travel, War and Faith*: 34–42. London: The British Library.

Skjærvø, P.O. 2006. Iran, vi. Iranian languages and scripts: (2) documentation, in E. Yarshater (ed.) *Encyclopaedia Iranica* 13: 348–66. New York: Encyclopaedia Iranica Foundation.

Skjærvø, P.O. 2009. Khotan, in E. Yarshater (ed.) *Encyclopaedia Iranica*, accessed 27th October 2017, <http://www.iranicaonline.org/articles/ khotan>.

Skjærvø, P.O. 2012. Khotan, an early center of Buddhism in Chinese Turkestan, in J. McRae and J. Nattier (eds) *Buddhism Across Boundaries: the Interplay of Indian, Chinese, and Central Asian Source Materials* (Sino-Platonic Papers 222): 106–41. Philadelphia: University of Pennsylvania.

Skjærvø, P.O. 2016. Turks and Turkic in Khotanese texts from Khotan and Dunhuang, in É. Csató, L. Johanson, A. Róna-Tas and B. Utas (eds) *Turks and Iranians: Interactions in Language and History*: 13–28. Wiesbaden: Harrassowitz.

Skory, S.A. 1997. *Steblev: skifskiy mogilnik v Porose*. Kiev: Institute of Archaeology, Ukrainian Academy of Sciences.

Skory, S.A. 1999. Data bol'shogo Ryzhanovskogo kurgana (po arheologicheskim dannym), in G.N. Toschev (ed.) *Problemy skifo-sarmatskoj arheologii Severnogo Prichernomor'ja (K 100-letiju B.N. Grakova)*: 240–41. Zaporozhye: Zaporozhskiy State University Press.

Skory, S.A. 2005. Antichnaya keramicheskaya posuda iz bolshogo Ryizhanovskogo kurgana, in V.I. Gulyaev (ed.) *Drevnosti Evrazii ot ranney bronzyi do rannego srednevekovya. Pamyati V.S. Olhovskogo*: 535–46. Moscow: Institute of Archaeology, Russian Academy of Sciences.

Skory, S.A. and Ya. Khokhorovsky 2009. Aristokraticheskij kurgan Skifskaja Mogila vblizi Motroninskogo gorodischa. *Stratum plus* 2005-2009/3: 234–76.

Skory, S.A., Ya. Khokhorovsky, V.P. Grigoryev and Ya. Rydzevskaya 1999. Tsentral'naya mogila Bol'shogo Ryzhanovskogo kurgana. *Archeologiya* 1999/1: 94–105.

Skripkin, A.S. 1987. Problemy khronologii sarmatskoy kultury i ee istoricheskij aspekt, in V.P. Shilov (ed.) *Zadachi arkheologii v svete reshenij XXVII sezda KPSS. Tezisy dokladov Vsesoyuznoy konferentsii.* Suzdal: Academy of Sciences.

Skripkin, A.S. 1990. *Aziatskaja Sarmatija. Problemy khronologii i ee istoricheskij aspect*. Saratov: University Publishing House.

Skripkin, A.S. 2000. K probleme vydeleniya sarmatskih pamyatnikov Aziatskoy Sarmatii II–I vv. do n.e., in V.N. Myshkin (ed.) *Rannesarmatskaya kultura: formirovanie, razvitie, khronologiya. Materialy IV mezhdunarodnoy konferentsii 'Problemy sarmatskoy arkheologii i istorii'*: vol. 1, 37–149. Samara: SNC RAN.

Skripkin, A.S. 2005. Sarmatskie mechi s kolcevym navershiem, in I.V. Belotserkovskaya (ed.) *II-e Gorodsovskie chteniya* (Trudy GIM 145): 171–85. Moscow: GIM.

Skripkin, A.S. and V.M. Klepikov 2004. Khronologii rannesarmatskoj kultury Nizhnego Povolzhya, in *Sarmatskie kultury Evrazii: problemy regionalnoy khronologii. Doklady k 5-y mezhdunarodnoy konferentsii 'Problemy sarmatskoy arkheologii i istorii'*: 95–106. Krasnodar: OOO 'Firma NSS'.

Skripkin, A.S., V.M. Klepikov and M.G. Moshkova 2002. Ob odnoy popytke modernizatsii sarmatskoy periodizatsii. *Rossiyskaya Arkheologiya* 2002/1: 101–12.

Slyusarenko, I.Y. 2000. Dendrokhronologicheskiy analiz dereva iz pamyatnikov pazyrykskoy kultury Gornogo Altaya. *Arkheologiya, Etnografiya i Antropologiya Evrazii* 4 (2000/4): 122–30.

Smekalova, T.N. and A.V. Chudin 2009. Magnitnaya razvedka i nekotoryje naturnyje nablyudenija na kurgannoj gruppe Mamai Gora v Zaporozhskoj oblasti, in S.I. Andrukh and G.N. Toshchev (eds) *Mogilnik Mamai Gora*: vol. IV, 281–93. Zaporozhye: Zaporozhskiy State University Press.

Smekalova, T.N., S.G. Koltukhov and Yu.P. Zaitsev 2015. *Arkheologicheskie atlasy Severnogo Prichernomorya. Atlas pozdneskifskih gorodisch predgornogo Kryma*. St. Peterburg: Aletejja.

Smekalova, T., O. Voss, S. Smekalov, V. Myts and S. Koltukhov 2005. Magnetometric investigations of stone constructions within large ancient barrows of Denmark and Crimea. *Geoarchaeology* 20/5 (May): 461–82.

Smirnov, K.F. 1959. Kurgany u sel Ilovatka i Politotdelskoe, in *Materialy i issledovaniya po arkheologii SSSR [MIA 60]*: 206–322. Moscow: Izdatelstvo Akademii Nauk SSSR.

Smirnov, K.F. 1961. *Vooruzheniye savromatov*. Moscow: Soviet Academy of Sciences.

Smirnov, K.F. 1964. *Savromaty (rannyaya istoriya i kultura sarmatov)*. Moscow: Russian Academy of Sciences.

Smirnov, K.F. 1975. *Sarmaty na Ileke*. Moscow: Russian Academy of Sciences.

Smirnov, N.Yu. 2005. K voprosu o sostavnykh psaliyakh epokhi pozdney bronzy – nachala rannego zheleznogo veka na vostoke Evraziyskikh stepey, in A.A. Tishkin (ed.) *Snaryazheniye kochevnikov Evrazii*: 88–91. Barnaul: Altai State University Press.

Smirnov, N.Yu. 2009. Nekotorye zamechaniya k voprosu o peredneaziatskikh importakh v komplekse kurgana Arzhan. *Zapiski Instituta istorii materialnoy kultury* 4: 110–21. St. Petersburg: 'Dmitry Bulanin' Press.

Smirnov, N.Yu. 2014. 'ἐν τούτῳ νίκα' ili ob odnom proisshestvii, sluchivshemsya so skifami pri ih vozvrashchenii iz Azii (Herod. IV. 1. 3, 3, 4), in M.O. Tarasenko (ed.) *Doislams'kij Bliz'kij Skhid: Istoriya, Religiya, Kul'tura*: 235–240. Kiev: Krymskyi Institute of Oriental Studies, Ukrainian National Academy of Sciences.

Smith, A. 1776. *An Inquiry into the Nature and Causes of the Wealth of Nations*. Dublin: Whitestone.

So, J.F. 2014. Foreign/Eurasian elements in pre-imperial Qin culture: Materials, techniques and types, in Liu Yang (ed.) *Beyond the First Emperor's Mausoleum: New Perspectives on Qin Art*: 192–211. Seattle: University of Washington Press.

So, J.F. and E.C. Bunker 1995. *Traders and Raiders on China's Northern Frontier*. Seattle and London: Arthur M. Sackler Gallery, Smithsonian Institution in association with the University of Washington Press.

Soloviov, A.I. 2003. *Oruzhiye i dospekhi. Sibirskoye vooruzheniye ot kamennogo veka do srednevekovya*. Novosibirsk: Infolio Press.

Solovyov, S. 1999. *Ancient Berezan: The Architecture, History, and Culture of the First Greek Colony in the Northern Black Sea* (Colloquia Pontica 4). Leiden: E.J. Brill.

Sono, T. and S. Fukai 1968. *Dailaman III. The excavations at Hassani Mahale and Ghalekuti 1964* (The Tokyo University Iraq–Iran Archaeological Expedition

Report 8). Tokyo: The Institute of Oriental Culture, The University of Tokyo.
Sooke, A. 2017. Feared, loathed, admired ... and then forgotten. *The Daily Telegraph*, *Review* 26th August: 14–15.
Sorokin, S.S. 1968. Drevniye kamennye izvayaniya Yuzhnogo Altaya. *Sovetskaya Arkheologiya* 1968/1: 260–62.
Sorokin, S.S. 1969. Bolshoy Berelskiy kurgan (polnoe izdanie materialov raskopok 1865 i 1959 g.). *Trudy gosudarstvennogo Ermitazha* 9: 208–36.
Sorokin, S.S. 1978. Otrazheniye mirovozzreniya rannikh kochevnikov Azii v pamyatnikakh materialnoy kultury. *Kultura Vostoka. Drevnost i rannee srednevekovye*: 172–91. Leningrad: Aurora.
Sosnovsky, G.P. 1933. O nakhodkakh Oglakhtinskogo mogilnika, in N.Ya. Marr (ed.) *Problemy istorii materialnoy kultury* 7/8: 34–41. Leningrad: State Academy of the History of Material Culture.
Soucek, S. 2000. Tarim, in P.J. Bearman, Th. Bianques, C.E. Bosworth and E. van Donzel (eds) *Encyclopaedia of Islam* 10: 302 (second edition). Leiden: E.J. Brill.
Șovan, O.L. 2016. *Repertoriul arkheologic al județului Botoșani*. Botoșani: Muzeul Județean Botoșani.
Sovetova, O.S. 1987. O svoeobraznyh izobrazhenijah konej so skal Oglahty, in A.I. Martynov and V.I. Molodin (eds) *Skifo-sibirskiy mir. Iskusstvo i ideologiya*: 139–43. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.
Sovetova, O.S. 2005. *Petroglify tagarskoj epohi na Enisee (sjuzhety i obrazy).* Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.
Sovetova, O.S. 2006. 'Gospodin konej' na kuninskih skalah, in V.V. Bobrov (ed.) *Arkheologiya Yuzhnoy Sibiri* 24: 128–30. Kemerovo: Letopis'.
Sovetova, O.S. and E.A. Miklashevich 1999. Khronologicheskie i stilisticheskie osobennosti sredneeniseyskih petroglifov, in V.V. Bobrov (ed.) *Archeologiya, ethnografiya i muzeynoe delo*: 47–74. Kemerovo: Kemerovo State University.
Spaer, M. 1993. Gold-glass beads: a review of the evidence. *Beads* 5: 9–25.
Spassky, G.I. 1857. O dostoprimechatelneyshih pamyatnikah sibirskih drevnostey i skhodstve nekotoryh iz nih s velikorusskimi, in G.N. Nebol'sin (ed.) *Zapiski Imperatorskogo Russkogo Geograficheskogo Obshhestva* 12: 111–81.
Speiser, N. 1983. *The Manual of Braiding*. Basel: Speiser.
Spengler, R.N. 2019. *Fruit from the Sands: the Silk Road Origins of the Foods we Eat*. Oakland [CA]: University of California Press.
Sprockhoff, E. 1934. *Die germanischen Vollgriffschwerter der jüngeren Bronzezeit* (Römisch-Germanische Forschungen 9). Berlin and Leipzig: Walter de Gruyter.
Stambulnik, E.U. 1983. Noviye pamyatniki Gunno-Sarmatskogo vremeni b Tuve (nekotoriye itogi rabot), in V.M. Masson (ed.) *Drevniye Kulturi Euraziiskih Stepei*: 34–41. Leningrad: Institute for the History of Material Culture, Russian Academy of Sciences.
Stan, D. and B. Constantinescu 2014. Analiza compoziţională a unor artefacte geto-dacice de aur găsite în Muntenia și Moldova, in S. Forțiu and A. Cîntar (eds) *Arkheovest II. In Honorem Gheorghe Lazarovici. Interdisciplinaritate în Arkheologie*: 667–76. Szeged: JATEPress Kiadó.
Stark, S. 2012. Nomads and networks: elites and their connections to the outside world, in S. Stark, K.S. Rubinson, Z.S. Samashev and J.Y. Chi (eds) *Nomads and Networks: The Ancient Art and Culture of Kazakhstan*: 106–39. New York and Princeton: Institute for the Study of the Ancient World and Princeton University Press.
Stark, S., K.S. Rubinson, Z. Samashev and J.Y. Chi (eds) 2012. *Nomads and Networks. The Ancient Art and Culture of Kazakhstan*. New York and Princeton: Institute for the Study of the Ancient World and Princeton University Press.
Stauffer, A. 2010. Textilfunde aus Aržan 2, in K. Chugunov, H. Parzinger and A. Nagler (eds) *Der skythenzeitliche Fürstenkurgan Aržan 2 in Tuva* (Archäologie in Eurasien 26 / Steppenvölker Eurasiens 3): 199–211. Mainz am Rhein: Philipp von Zabern.
Stavisky, B.Ya. 1986. Problèmes d'histoire de la Bactriane à la veille de la formation de l'état Kušān, in P. Bernard, M. Burda, F. Grenet and P. Leriche (translated and edited) *La Bactriane sous les Kušāns: problèmes d'histoire et de culture*: 113–26. Paris: Librairie d'Amérique et d'Orient (expanded and corrected edition).
Steblin-Kamensky, I.M. 2009. *Gaty Zaratushtry. Perevod s Avestiiskogo. Vstupitel'nye Stat'i, Kommentarii I Prilozhenia*. St. Peterburg: Peterburgskoe Vostokovedenie.
Steckel, R.H. and J.C. Rose (eds) 2002. *The Backbone of History: Health and Nutrition in the Western Hemisphere*. Cambridge: Cambridge University Press.
Stein, G. 2002. From Passive Periphery to Active Agents: Emerging Perspectives in the Archaeology of Inter-Regional Interaction. *American Anthropologist* 104: 903–16.
Stein, M.A. 1921. *Serindia. Detailed Report of Explorations in Central Asian and Westernmost China*. London: Oxford University Press.
Stein, M.A. 1929. *An Archaeological Tour in Waziristān and Northern Balūchistān* (Memoirs of the Archaeological Survey of India 37). Calcutta: Government of India.
Stepanova, E.V. 2004. Bosporskiye sedla, in V.Yu. Zuev (ed.) *Bosporsky fenomen: Problemy khronologii i datirovki pamyatnikov. Materialy Mezhdunarodonoi nauchnoi konferentsii*: Part 1, 231–46. St. Petersburg: State Hermitage Museum.
Stepanova, E.V. 2006. Evolyutsiya konskogo snaryazheniya i otnositelnaya khronologiya

pamyatnikov pazyrykskoy kultury. *Arkheologicheskiye vesti* 13: 102–50.

Stepanova, E.V. 2011. Sedla gunno-sarmatskogo vremeni – popytka reconstruktsii, in N.A. Makarov and E.N. Nosov (eds) *Trudy III (XIX) Arkheologichesko syezda*: vol. 1, 388–89. St. Petersburg / Moscow / Veliky Novgorod: 'Novgorod technopark'.

Stepanova, E.V. 2014. Kitayskie sedla III v. do n.e.–III v. n.e., in A.G. Sitdikov, N.A. Makarov and A.P. Derevyanko (eds) *Trudy IV (XX) Arkheologichesko syezda*: vol. 2, 235–40. Kazan: 'Otechestvo'.

Stepanova, E.V. 2017. Male headgear, in St J. Simpson and S. Pankova (eds) *Scythians: warriors of ancient Siberia*: 112–13, cats 36–37. London: Thames and Hudson.

Stepanova, E.V. and S.V. Pankova 2017. Personal appearance, in St J. Simpson and S. Pankova (eds) *Scythians: warriors of ancient Siberia*: 88–97. London: Thames and Hudson.

Stepanova, E.V. and A.I. Torgoev 2008. K atributsii dvukh sedel iz sobraniya gosudarstvennogo Ermitazha, in A.A. Tuallogov (ed.) *Otrazheniye tsivilizatsionnykh protsessov v arkheologicheskikh kulturakh Severnogo Kavkaza i sopredelnykh territoriy. Jubileinye XXV 'Krupnovskie chtenija'*: 354–56. Vladikavkaz: North Ossetia Institute of Humanitarian and Social Studies named after V.I. Abaev.

Stepanova, N.F., E.B. Vadetskaya and A.V. Polyakov (eds) 2010. *Afanas'evskij Sbornik 1*. Barnaul: Azbuka.

Stepanova, N.F., E.B. Vadetskaya and A.V. Polyakov (eds) 2012. *Afanas'evskij Sbornik 2*. Barnaul: Azbuka.

Stetskovich, E.S. 1997. Khudozhniki Akademii nauk i Kunstkamery v xviii veke, in *Kunstkamera. Etnograficheskie tetradi* 11: 248–67.

Stickler, T. 2007. *Die Hunnen*. Munich: C.H. Beck.

Stockhammer, P. 2004. *Zur Chronologie, Verbreitung und Interpretation urnenfelderzeitlicher Voll griff schwerter* (Tübinger Texte, MUFA). Rahden: Marie Leidorf.

Stodulski, L., E. Farrell and R. Newman 1984. Identification of ancient Persian pigments from Persepolis and Pasargadae. *Studies in Conservation* 29: 143–54.

Stöllner, T. and Z. Samashev (eds) 2013. *Unbekanntes Kasachstan. Archäologie im Herzen Asiens*. Bochum: Deutsches Bergbau Museum (two volumes).

Stronach, D.B. 1978. *Pasargadae: A Report on the Excavations Conducted by the British Institute of Persian Studies from 1961 to 1963*. Oxford: Clarendon Press.

Stucky, R. 1985. Achämenidische Hölzer und Elfenbeine aus Ägypten und Vorderasien im Louvre. *Antike Kunst* 26/1: 7–32.

Sulimirsky, T. 1970*a*. *Prehistoric Russia*. London: John Baker.

Sulimirsky, T. 1970*b*. *The Sarmatians*. London: Thames and Hudson.

Sulimirski T. and T. Taylor 1991. The Scythians, in *Cambridge Ancient History* 3/2: 547–90. Cambridge: Cambridge University Press.

Summerer, L. 2007. Picturing Persian Victory: The Painted Battle Scene on the Munich Wood, in A. Ivantchik and V. Licheli (eds) *Achaemenid Culture and Local Traditions in Anatolia, Southern Caucasus and Iran*: 3–30. Leiden: E.J. Brill.

Summerer, L. 2008. Imaging a Tomb Chamber. The Iconographic Program of the Tatarlı Wall Paintings, in S.M.R. Darbandi and A. Zournatzti, A. (eds) *Ancient Greece and Ancient Iran. Cross-Cultural Encounters. Athens, 11–13 November 2006*: 265–300. Athens: National Hellenic Research Foundation and Cultural Centre of the Embassy of the Islamic Republic of Iran.

Summerer, L. 2010. Wall Paintings, in L. Summerer and A. von Kienlin (eds) *Tatarlı: renklerin dönüşü / The return of colours / Rückkehr der Farben*: 120. Istanbul: Istanbul Archaeological Museum.

Summerer, L. and A. von Kienlin (eds) 2010. *Tatarlı: renklerin dönüşü / The return of colours / Rückkehr der Farben*. Istanbul: Istanbul Archaeological Museum.

Sun Ji 1985. Zhongguo gu duzhou mache de jiegou [The structure of China's ancient chariot with a single shaft]. *Wenwu* 8: 25–40.

Sundermann, W. 1996. City-states in the Tarim Basin, in J. Herrmann and E. Zürcher (eds) *History of Humanity: from the seventh century BC to the seventh century AD*: vol. III, 469–71. Paris: UNESCO and Routledge.

Suprunenko, O.B., V.M. Vadimov, V.V. Vozhdaenko, G.Yu. Ivakin, I.I. Korost, I.M. Kulatova, V.Yu. Murzin, O.V. Simonenko, A.A. Skory, O.M. Titova and G.I. Fasiy (eds) 2016. *Fenomen Bil's'koho horodyshcha, 2016: Do 95-richchya vid dnya narodzhennya vyznachnoho ukrayins'koho arkheoloha profesora B.A. Shramka (1921–2012) ta 110-richchya vid pochatku arkheolohichnykh doslidzhen' Bil's'koho horodyshcha: Zbirnyk naukovykh prats' i materialiv konferentsiyi*. Kiev and Poltava: Centre for Monuments, National Academy of Sciences of Ukraine and UTOPI.

Sutiagina, N.A. 2014. Ballodovsky kurgan (Noin-Ula, Severnaya Mongolia), in K.V. Chistyakov (ed.) *Rossiyskoye izucheniye Tsentralnoy Azii: istoricheskiye i sovremenniye aspekty (k 150-letiyu P. K. Kozlova)*: 258–77. St. Petersburg: Polytekhnika-servis.

Sutiagina, N.A. and D.A. Kukina 2017. Kollektsiya nakhodok iz kurganov Noin-Uly (Severnaya Mongolia) na vystavke v Berline v 1929 godu, in N.N. Diakov and A.S. Matveev (eds) *Aziya i Afrika: naslediye i sovremennost. XXIX Mezhdunarodny congress po istochnikovedeniyu i istoriografii stran Azii i Afriki*: vol. 1, 332–34. St. Petersburg: NP-Print Studio.

Sutiagina, N.A. and O.G. Novikova 2016. Kitayskaya lakovaya chashechka iz pogrebeniya 'zolotogo cheloveka' (po materialam mogil'nika Bugry v predgor'yakh Altaya). *Arkheologiya, Etnografiya i Antropologiya Evrazii* 44 (2016/4): 83–91.

Sverchkov, L.M. 2007. Ellinisticheskaya krepost' Kurganzol. Raskopki 2004 g. *Trudy Baysunskoy*

Nauchnoy Ekspeditsii. Arkheologiya, Istoriya i Etnografiya 3: 31–66.

Sverchkov, L.M. 2008. The Kurganzol Fortress (on the history of Central Asia in the Hellenistic era). *Ancient Civilizations from Scythia to Siberia* 14/1–2: 123–91.

Sverchkov, L.M. 2009. A history of research on ancient mining in Uzbekistan. *Archäologische Mitteilungen aus Iran und Turan* 41: 141–64.

Sverchkov, L.M. 2013. *Kurganzol – krepost' Aleksandra na yuge Uzbekistana*. Tashkent: SMI-ASIA.

Svyatko, S.V. and A.Z. Beisenov 2017. Pervie izotopnie dannie o diete naseleniya tasmolinskoi kulturi. *Samarskii naychnii vestnik* 6/3 (20): 223–27.

Svyatko, S.V., J.P. Mallory, E.M. Murphy, A.V. Polyakov, P.J. Reimer and R.J. Schulting 2009. New radiocarbon dates and a review of the chronology of prehistoric populations from the Minusinsk Basin, southern Siberia, Russia. *Radiocarbon* 51/1: 243–73.

Svyatko, S.V., R.J. Schulting, J.P. Mallory, E.M. Murphy, P.J. Reimer, V.I. Khartanovich, Y.K. Chistov and M.V. Sablin 2013. Stable isotope dietary analysis of prehistoric populations from the Minusinsk Basin, southern Siberia, Russia: a new chronological framework for the introduction of millet to the eastern Eurasian steppe. *Journal of Archaeological Science* 40: 3936–45.

Sylwan, V. 1941. *Woollen textiles of the Lou-lan people* (Reports from the Scientific Expedition to the North-Western provinces of China under the leadership of Dr Sven Hedin, VII. Archaeology 2: The Sino-Swedish expedition 15). Stockholm: Tryckeri Aktiebolaget Thule.

Szemerényi, O. 1980. *Four Old Iranian Ethnic Names: Scythian – Skudra – Sogdian – Saka* (Sitzungsberichte, Österreichische Akademie der Wissenschaften. Philosophisch-historische Klasse 371). Vienna: Austrian Academy of Sciences.

Szuchman, J. (ed) 2009. *Nomads, tribes, and the state in the Ancient Near East. Cross-disciplinary perspectives* (Oriental Institute Seminars 5). Chicago: The Oriental Institute of the University of Chicago.

Szudy, M.J. 2015. Archery Equipment in the Neo-Assyrian Period. Unpublished PhD dissertation, University of Vienna.

Tairov, A.D. 2000. Rannii zhelezny vek, in N.O. Ivanova (ed.) *Drevnyaya istoriya Yuzhnogo Zauralya t. 2: Rannii zhelezny vek i srednevekovje*: 3–173. Chelyabinsk: South Ural State University Press.

Taishan, Y. 1998. *A Study of Saka History* (Sino-Platonic Papers 80): 1–225. Philadelphia: University of Pennsylvania.

Taishan, Y. 2014. *The name Sakā* (Sino-Platonic Papers 251): 1–13. Philadelphia: University of Pennsylvania.

Tallgren, A.M. 1917. *Collection Tovostine des antiquités préhistoriques de Minoussinsk conservies chez le Dr. Karl Hedman a Vasa. Chapitres d'archéologie sibérienne*. Helsinki: K. F. Puromiehen kirjapaino.

Tallgren, A.M. 1933. Inner Asiatic and Siberian Rock Pictures. *Eurasia Septentrionalis Antiqua* 8: 175–210. Helsinki.

Tallgren, A.M. 1937. The South Siberian cemetery of Oglakty from the Han period. *Eurasia Septentrionalis Antiqua* 11: 69–90. Helsinki.

Tallis, N. 2005. Transport and warfare, in J. Curtis and N. Tallis (eds) *Forgotten Empire: The World of Ancient Persia*: 210–17. London: British Museum Press.

Tallon, F. 1992. The Achaemenid Tomb on the Acropole, in P.O. Harper, J. Aruz and F. Tallon (eds) *The Royal City of Susa. Ancient Near Eastern Treasures in the Louvre*: 242–52. New York: Metropolitan Museum of Art.

Tao, Hua. 2017. Satuq Bughra Khan and the beginning of Islamization in the Tian Shan region, in J. Yijiu (ed.) *Islam* [*Dangdai zhongguo zongjiao yanjiu jingxuan congshu: Yisilanjiao*]: 116–34. Leiden: E.J. Brill.

Tavernier, J. 2007. *Iranica in the Achaemenid Period (ca. 550–330 B.C.): Lexicon of Old Iranian Proper Names and Loanwords Attested in Non-Iranian Texts*. Leuven: Peeters.

Taylor, T. 1989. Iron and Iron Age in the Carpatho–Balkan region: aspects of social and technological change, in M.-L. Sorensen and R. Thomas (eds) *The Bronze Age–Iron Age transition in Europe* (BAR International Series 483): 68–92. Oxford: British Archaeological Reports.

Taylor, T. 1994. Thracians, Scythians, and Dacians, in B.W. Cunliffe (ed.) *The Oxford Illustrated Prehistory of Europe*: 373–410. Oxford: Oxford University Press.

Taylor, T. 1996. Scythian and Sarmatian art, in J. Turner (ed) *The Dictionary of Art* 28: 319–26. London: Macmillan.

Taylor, T. 2001. Believing the Ancients: Quantitative and Qualitative Dimensions of Slavery and the Slave Trade in Later Prehistoric Eurasia. *World Archaeology* 33/1: 27–43.

Taylor, T. 2003*a*. *The Buried Soul: How Humans Invented Death.* London: 4th Estate (revised paperback edition).

Taylor, T. 2003*b*. A platform for studying the Scythians. *Antiquity*: 77: 413–15.

Taylor, T. 2010. Modeling the 'Amazon' phenomenon: Colonization events and gender performances, in D.J. Bolender (ed.) *Eventful archaeologies: New approaches to social transformation in the archaeological record* (IEMA Distinguished Monograph Series): 132–50. Albany: State University of New York Press.

Taylor, T. 2011. Death, in T. Insoll (ed.) *The Oxford Handbook of the Archaeology of Ritual and Religion* (Oxford Handbooks in Archaeology): 89–104. Oxford: Oxford University Press.

Teleagă, E. 2016. Începuturile artei figurative tracice în secolul al V-lea a.Chr., cu privire specială asupra Dobrogei de nord și a spațiului de la nord de Dunăre până la Nistru. *Studii și Cercetări de Istorie Veche și Arkheologie* 67/3–4: 207–68.

Telnov, N.P., I.A. Chetverikov I.A. and V.S. Sinika 2012. Skifskij mogilnik III–II vv. do n.e. u s. Glinoe na levoberezhe Nizhnego Dnestra (predvaritelnye itogi issledovanija), in N.P. Telnov (ed.) *Drevnosti Severnogo Prichernomorya III–II vv. do n.e.* Tiraspol': OOO 'Remont vychislitelnoy tehniki Publ.

Teng Minyu 2010. Gudai qihou shijian yu gudai wenhua jian guanxi de zai sikao – yi Quanxinshi Danuanqi de Chifeng diqu weili [Re-thinking of the connetions between ancient climate events and ancient culture – by Chifeng region during Megathermal period of Holocene for instance]. *Bianjiang kaogu yanjiu* 9: 238–46.

Teodor, S. 1999. *Regiunile est-carpatice ale României în secolele V–II î.d. Hr*. Bucharest: Vavila Edinf SRL.

Terenozhkin, A.I. 1961. *Predskifsky period na dneprovskom pravoberezhye*. Kiev: Ukrainian SSR Academy of Sciences.

Terenozhkin, A.I. 1976. *Kimmeriytsy*. Kiev: Ukrainian SSR Academy of Sciences.

Tereshchenko, A.I. 2013. Podvodno-arkheologicheskiye issledovaniya torgovogo sudna 'Zmeinyy-Patrokl' (IV v. do n.e.) v Chernom more (polevyye sezony 2011–12 gg.), in M.Yu. Vakhtina, E.V. Gritsik, N.K. Zhizhina, S.V. Kashayev, N.A. Pavlichenko, O.Yu. Sokolova and V.A. Khrshanovskiy (eds) *Bosporskiy fenomen. Greki i varvary na Evraziyskom perekrestke: Materialy mezhdunarodnoy nauchnoy konferentsii (Sankt Peterburg. 19-22 noyabrya 2013 g.)*: 576–83. St. Petersburg: Nestor-Istoriya.

Thaplyal, K.K. 1972. *Studies in Ancient Indian Seals*. Lucknow: Akhila Bharatiya Sanskrit Parishad.

Thargyal, R. 2007. *Nomads of Eastern Tibet: Social Organization and Economy of a Pastoral Estate in the Kingdom of Dege*. Leiden and Boston: E.J. Brill.

Theunissen, R., P. Grave and G. Bailey 2000. Doubts on diffusion: Challenging the Assumed Indian Origin of Iron Age Agate and Carnelian Beads in Southeast Asia. *World Archaeology* 32: 84–105.

Thompson, G. 1965. Iranian Dress in the Achaemenian Period. Problems concerning the *Kandys* and other garments. *Iran* 3: 121–26.

Thordarson, F. 1988. The Scythian funeral custom: some notes on Herodotus IV, 71-75, in W. Sundermann, J. Duchesne-Guillemin and F. Vahman (eds) *A Green Leaf: papers in honour of Professor Jes Asmussen* (Acta Iranica 28): 539–47. Leiden: E.J. Brill.

Thote, A. 1999. De quelques conventions picturales. Le char et ses représentations aux Ve-IVe siècles avant notre ère, in F. Martin (ed.) *Etudes chinoises (Mélanges de sinologie offerts à Monsieur Jean-Pierre Diény)* 18/1–2: 179–220.

Tillander-Godenhielm, U. (ed.) 2000. *Golden Years of Fabergé: Drawings and Objects from the Wigström Workshop*. [France]: A La Vieille Russie and Alain de Gourcuff.

Tisdall, C. 1978. Frozen tombs. *The Guardian* 18th November: 13.

Tishkin, A.A. 1999. Ukrasheniya ranneskifskogo vremeni iz Gornogo Altaya, in Yu.A. Kirjushin and A.A. Tishkin (eds) *Itogi izucheniya skifskoy epokhi Altaya i sopredelnykh territoriy: Sbornik nauchnykh statey*: 184–90. Barnaul: Altai State University Press.

Tissot, F. 1985. *Gandhara*. Paris: J. Maisonneuve.

Tisucká, M. and L. Stančo (eds) 2016. *Afghanistan. Rescued Treasures of Buddhism*. Prague: National Museum.

Tite, M., T. Pradell and A. Shortland 2008. Discovery, production and use of tin-based opacifiers in glasses, enamels and glazes from the late Iron Age onwards: a reassessment. *Archaeometry* 50/1: 67–84.

Tkaciuc, M. 1994. Manifestări culturale din sec. V-I a.Chr. *Thraco-Dacica* 15: 215–56.

Tokhtas'ev, S.R. 1992. Cimmerians, in E. Yarshater (ed.) *Encyclopaedia Iranica* 5: 563–67. Costa Mesa: Mazda.

Tolstov, S.P. 1958. Raboty Khorezmskoj Ekspedicii 1949–1953 gg., in S.P. Tolstov (ed.) *Arkheologicheskie i etnograficheskie raboty Khorezmskoj ekspedicii 1949–1953 gg.* (Trudy Khorezmskoj Arkheologo–Etnograficheskoj Ekspedicii II): 7–258. Moscow: Russian Academy of Sciences.

Toleubayev, A., R. Zhumatayev and K. Toleubayeva 2013. Royal Mound 'Baygetobe' from the Burial Ground Shilikty. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrual Engineering* 7/6: 1874–78.

Tomabechi, Y. 1983/84. Wall Paintings from Til Barsip. *Archiv für Orientforschung* 29/30: 63–74.

Tonkova, M. 2002. Classical jewellery in Thrace: origins and development, archaeological contexts. *Talanta* 32/33: 277–88.

Topal, D. 2014*a*. Akinaki klassicheskoy Skifii: tip Solokha, in S.I. Lukyashko (ed.) *Voyna i voennoe delo v skifo-sarmatskom mire*: 380–406. Rostov-on-Don: YuNC RAN.

Topal, D. 2014*b*. Finalnaya liniya razvitiya mechey klassicheskoy Skifii. Sootnoshenie tipov Chertomlyk i Shulgovka. *Stratum plus* 2014/3: 129–56.

Topal, D. 2015. The use of bronze in making the early Scythian akinakai. *Tyragetia* 9/24: 29–50.

Topal, D.A. and I.V. Bruyako 2012. Nakhodki klinkovogo oruzhiya rannikh kochevnikov iz Orgeevskogo rayona. *Stratum plus* 2012/3: 133–44.

Topal, D., S. Ţerna and S. Popovici 2014. Akinakai de tip Soloha în contextual unei noi descoperiri de la Nistrul de Jos. *Peuce* 12: 9–67.

Torgoev, A.I. 2009. Kenkolsky mogilnik, in S.L. Kravets (ed.) *Bolshaya Rossiyskaya Enciklopediya* 13: 571. Moscow: Great Russian Encyclopaedia.

Tosi, M. 1969. Excavations at Shahr-i-Sokhta: Preliminary report on the second campaign, September–December 1968. *East and West* 19/3–4: 283–386.

Tosi, M. 1980. Karneol. *Reallexikon der Assyriologie und vorderasiatischen Archäologie* 5: 448–52.

Treister, M.Y. 1994. Sarmatskaya shkola khudozhestvennoy torevtiki (k otkrytiyu serviza iz Kosiki). *Vestnik drevnei istorii* 1994/1: 172–204.

Treister, M.Y. 2001. *Hammering Techniques in Greek and Roman Jewellery and Toreutics* (Colloquia Pontica 8). Leiden / Cologne / Boston: E.J. Brill.

Treister, M.Y. 2004. Eastern jewellery in Sarmatian burials and eastern elements in the jewellery production of the North Pontic area in the 1st century AD. *Iranica Antiqua* 39: 295–319.

Treister, M.Y. 2009*a*. Silver-gilt Bowl from Burial-mound B at Prokhorovka. *Ancient Civilizations from Scythia to Siberia* 15: 183–89.

Treister, M.Y. 2009*b*. Silver Phialai from the Prokhorovka Burial-mound N°.1. *Ancient Civilizations from Scythia to Siberia* 15: 94–135.

Treister, M.Y. 2010*a*. 'Achaemenid' and 'Achaemenid-inspired' Goldware and Silverware, Jewellery and Arms and their Imitations to the North of the Achaemenid Empire, in J. Nieling and E. Rehm (eds) *Achaemenid Impact in the Black Sea Communication of Powers*: 223–79. Aarhus: Aarhus University Press.

Treister, M.Y. 2010*b*. Oruzhiye sarmatskogo tipa na Bospore v I–II vv. n.e. *Drevnosti Bospora* 14: 484–561.

Treister, M.Y. 2012. Silver Phalerae with a Depiction of Bellerophon and the Chimaera from a Sarmatian Burial in Volodarka (Western Kazakhstan). A Reappraisal of the Question of the So-Called Graeco-Bactrian Style in Hellenistic Toreutics. *Ancient Civilizations from Scythia to Siberia* 18/1: 51–109.

Treister, M.Y. 2013*a*. Achämenidische Importe im südlichen Uralvorland. Chronologie. Dynamik. Zusammensetzung. Interpretation, in M. Treister and L. Yablonsky (eds) *Einflüsse der achämenidischen Kultur im südlichen Uralvorland (5.–3. Jh. v. Chr.)*: 301–15. Vienna: Phoibus Verlag.

Treister, M.Y. 2013*b*. Achämenidischer Schmuck und Gewandschmuck aus Edelmetallen im südlichen Uralvorland. Erzeugnisse des achämenidischen Kreises und lokale Nachahmungen. Werke der post-achämenidischen Tradition, in M. Treister and L. Yablonsky (eds) *Einflüsse der achämenidischen Kultur* im südlichen Uralvorland (5.–3. Jh. v. Chr.): 158–91. Vienna: Phoibus Verlag.

Treister, M.Y. 2013*c*. Glasgefäße des achämenidischen Kreises aus dem südlichen Uralvorland, in M. Treister and L. Yablonsky (eds) *Einflüsse der achämenidischen Kultur im südlichen Uralvorland (5.–3. Jh. v. Chr.)*: 128–35. Vienna: Phoibus Verlag.

Treister, M.Y. 2013*d*. Bronzespiegel aus dem südlichen Uralvorland: nahöstliche und südasiatische Importe und lokale Nachahmungen, in M. Treister and L. Yablonsky (eds) *Einflüsse der achämenidischen Kultur* im südlichen Uralvorland (5.–3. Jh. v. Chr.): 143–57. Vienna: Phoibus Verlag.

Treister, M.Y. 2013*e*. Alabastergefäße aus dem südlichen Uralvorland, in M. Treister and L. Yablonsky (eds) *Einflüsse der achämenidischen Kultur* im südlichen Uralvorland (5.–3. Jh. v. Chr.): 119–27. Vienna: Phoibus Verlag.

Treister, M.Y. 2013*f*. Die Edelmetallgefäße des achämenidischen Krieses aus dem südlichen Uralvorland, in M. Treister and L. Yablonsky (eds) *Einflüsse der achämenidischen Kultur* im südlichen Uralvorland (5.–3. *Jh. v. Chr.)*: 69–108. Vienna: Phoibus Verlag.

Treister, M.Y. 2016. On the Find of a Phalera Made from the Medallion of a Hellenistic Cup in Barrow no. 20 of the Noin-Ula Burial Ground (Northern Mongolia). *Ancient Civilizations from Scythia to Siberia* 22/1: 55–95.

Treister, M.Y. 2019. Skarabeoid iz pogrebeniya 1 kurgana 1/2015 mogilnika Cheboratev V na nizhnem Don (o blizhnevostochnykh pechatyakh v pogrebeniyakh srednesarmatskogo vremeni). *Rossiyskaya Arkheologiya* 2019/1: 20–31.

Treister, M. and L. Yablonsky (eds) 2012. *Vlijanija akhemenidskoj kultury v juzhnom Priurale (V–III vv. do n.e.)* (Drevnjaja torevtika i juvelirnoe delo v vostochnoj Evrope). Moscow: Taus [= *Einflüsse der achämenidischen Kultur* im südlichen Uralvorland (5.–3. *Jh. v. Chr.)*. Vienna 2013].

Treister, M. and L. Yablonsky (eds) 2013. Schlußfolgerungen, in M. Treister and L. Yablonsky (eds) *Einflüsse der achämenidischen Kultur* im südlichen Uralvorland (5.–3. *Jh. v. Chr.)*: 319–23. Vienna: Phoibus Verlag.

Tremblay, X. 2007. The spread of Buddhism in Serindia: Buddhism among Iranians, Tocharians and Turks before the 13th century, in A. Heirman and S.P. Bumbacher (eds) *The Spread of Buddhism* (Handbuch der Orientalistik VIII.16): 75–129. Leiden: E.J. Brill.

Trever, C. 1932. *Excavations in Northern Mongolia (1924–1925)* (Memoirs of the Academy of History of Material Culture 3). Leningrad: J. Fedorov Printing House.

Trever, K.V. and V.G. Lukonin 1987. *Sasanidskoye serebro. Sobraniye gosudarstvennogo Ermitazha. Khudozhestvennaya kultura Irana III–VIII vekov*. Moscow: 'Artiya'.

Trimm, C. 2017. *Fighting for the King and the Gods: A Survey of Warfare in the Ancient Near East*. Atlanta: SBL Press.

Trippett, F. (and the editors of Time-Life Books) 1978. *The First Horsemen*. [Amsterdam]: Time-Life International (reprint).

Trohani, G. 2013. Arta aurului și argintului în spațiul carpato-dunărean în secolele VI–III a.Chr., in R. Oanță-Marghitu (ed.) *Aurul și Argintul Antic al României. Catalog de Expoziție*: 64–75. Bucharest: National Museum of the History of Romania.

Trojanowicz, M., J. Orska-Gawrys, I. Surowiec, B. Szostek, K. Urbaniak-Walczak, J. Kehl and M. Wrobel 2004. Chromatographic Investigation of Dyes Extracted from Coptic Textiles from the National Museum in Warsaw. *Studies in Conservation* 49: 115–30.

Trudnovskaya, S.A. 1952. Ukrashennya pozdneantichnogo Xorezma po materialam raskopok Toprak-Kala, in S.P. Tolstov and T.A.

Zhdanko (eds) *Arkheologicheskie i etnographicheskie raboti Xorezmskoi ekspeditsii 1945–1948* (Trudy chorezmskoj archeologo-etnografičeskoj ekspedicii I): 119–34, pls I–III. Moscow: Soviet Academy of Sciences.

Trudnovskaya, S.A. 1979. Ranniye pogrebeniya yugo-zapadnoy kurgannoy gruppy mogilnika Tuz-gyr, in M.A. Itina (ed.) *Kočevniki na granicach Chorezma* (Trudy chorezmskoj archeologo-etnografičeskoj ekspedicii XI): 201–10. Moscow: Soviet Academy of Sciences.

Tsalkin, V.I. 1960. *Domashniye i dikiye zhivotnyye Severnogo Prichernomor'ya v epokhu rannego zheleza* (Materialy i Issledovaniya po Arkheologii SSSR = MIA) 53: 7–109.

Tsareva, E.G. 2010. Kilimy rannikh kochevnikov Tuvy i Altaya: k istorii slozheniya i razvitiya kilimnoy tekhniki v Evrazii, in P.M. Kozhin, M.F. Kosarev and N.A. Dubova (eds) *Na puti otkrytiya tsivilizatsii: sbornik statey k 80-letiyu V.I. Sarianidi* (Trudy Margianskoy arkheologicheskoy ekspeditsii): 566–91. St. Petersburg: Aleteya.

Tuplin, C. 2010. All the King's Horse: In Search of Achaemenid Persian Cavalry, in M. Trundle and G. Fagan (eds) *New Perspectives on Ancient Warfare*: 101–82. Leiden: E.J. Brill.

Tuplin, C. 2020. Sigillography and soldiers: cataloguing military activity on Achaemenid period seals, in E. Dusinberre, M.B. Garrison and W.F.M. Henkelman (eds) *The Art of Empire in Achaemenid Persia. Studies in honour of Margaret Cool Root*: 329-459. Leiden and Leuven: NINO and Peeters.

Tur, S.S. 2019. Prizhiznennyye travmy cherepa u skotovodov Gornogo Altaya skifskogo i gunno-sarmatskogo vremeni (V v. do n.e. – V v. n.e.). *Arkheologiya, Etnografiya i Antropologiya Evrazii* 47 (2019/2): 148–57.

Turbat, T. and D. Batsukh 2015. L'art dans la culture de Pazyryk et ses manifestations dans l'Altaï mongol, in P.-H. Giscard and T. Turbat (eds) *France-Mongolie: Découvertes Archéologiques. Vingt Ans de Partenariat. Catalogue de l'exposition*: 33–39. Oulan Bator: ShUA-iĭn Tüükh, arkheologiĭn khürėėlėn.

Turbat, T., P.-H. Giscard and D. Batsükh 2009. First Excavation of Pazyryk Kurgans in Mongolian Altai, in J. Bemmann, H. Parzinger, E. Pohl and D. Tseveendorzh (eds) *Current Archaeological Research in Mongolia. Papers from the First International Conference on 'Archaeological Research in Mongolia' held in Ulaanbaatar, 19th–23rd August 2007* (Bonn Contributions to Asian Archaeology 4): 221–30. Bonn: Vor- und Frühgeschichtliche Archäologie Rheinische Friedrich-Wilhelms-Universität Bonn.

Turchin, P. 2009. A theory for formation of large empires. *Journal of Global History* 4/2: 191.

Turner, C.G.II 1979. Dental anthropological indications among the Jomon people of central Japan: X. Peopling of the Pacific. *American Journal of Physical Anthropology* 51: 619–36.

Twilley, J. 2002. Pigment Analyses from the Grave Stelae and Architectural Fragments from Chersonesos, in M.A. Tiverios and D.S. Tsiafakis (eds) *Colour in Ancient Greece. The Role of Colour in Ancient Greek Art 700–31 BC. Proceedings of the conference held in Thessaloniki, 12th-16th April, 2000*: 171–78. Thessaloniki: Aristotle University of Thessaloniki.

Tyulyaev, S.I. 1988. *Iskusstvo Indii. III-e tysyacheletiye do n.e.–VII vek n.e.* Moscow: 'Artiya'.

Ubelaker, D.H. 1989. *Human Skeletal Remains* (Manuals on Archaeology 2). Washington: Smithsonian Institution (second edition).

Uchaneva, E.N., A.A. Kazarnitsky, A.V. Gromov and N.I. Lazaretova 2017. Naseleniye Minusinskoy kotloviny v rannem zheleznom veke: k voprosu o vnutrigruppovoy i mezhdugruppovoy izmenchivosti. *Barnaul Arkheologii, Antropologii i Etnografii* 36 (2017/1): 78–87.

Umanskiy, A.P., A.B. Shamshin and P.I. Shulga 2005. *Mogilnik skifskogo vremeni Rogozikha-I na levoberezhye Obi*. Barnaul: Altai State University Press.

Umehara, S. 1960. *Mōko Noin-Ura hakken no ibutsu*. Tokyo: Toyo Bunko.

Untracht, O. 1969. *Metal Techniques for Craftsmen*. London: Robert Hale.

Untracht, O. 1982. *Jewelry Concepts and Technology*. London: Robert Hale.

Unvala, J.M. 1953. Sassanian seals and Sassanian Monograms, in Sir Rustam P. Masani *et al.* (eds) *M.P. Khareghat Memorial Volume. 1. A symposium on Indo-Iranian and allied subjects*: 44–74. Bombay: Trustees of the Parsi Punchayet Funds and Properties.

Utchenko, S.L. (ed.) 1972. *Gerodot. Istoriya v Devyati Knigah. Perevod i Primechaniya G.A. Stratanovskogo*. Leningrad: Russian Academy of Sciences.

Uwe-Hartmann, J. 2005. Buddhism: Buddhism in Central Asia, in L. Jones (ed.) *Encyclopedia of Religion*: vol. 2, 1144–148. Detroit: Macmillan Reference USA (second edition).

Vadetskaya, E.B. 1985. Tashtykskiye nakosniki i prichyoski. *Kratkiye soobshcheniya Instituta Arkheologii* 184: 7–14.

Vadetskaya, E.B. 1986*a*. Mumii i pogrebalniye kukly tashtykskikh mogilnikov. *Kratkiye Soobshcheniya Instituta Arkheologii* 186: 33–41.

Vadetskaya, E.B. 1986*b*. *Arkheologicheskiye pamyatniki v stepyakh Srednego Eniseya.* Leningrad: Russian Academy of Sciences.

Vadetskaya, E.B. 1999. *Tashtykskaya epokha v drevnei istorii Sibiri* (Archaeologica Petropolitana VII). St. Petersburg: St. Petersburg Oriental Studies.

Vadetskaya, E.B. 2004. Novoye o tashtykskikh pogrebalnykh maskakh. *Arkheologiya, Etnografiya i Antropologiya Evrazii* 17 (2004/1): 51–64.

Vadetskaya, E.B. 2009. *Drevniye Maski Yeniseya*. St. Petersburg and Krasnoyarsk: Verso.

Vadetskaya, E.B. 2016. Okunevskie izvajanija: obzor nekotorykh rezultatov iikh izucenija, in A.P.

Derevyanko and V.I. Molodin (eds) *Altai among the Eurasian antiquities*: 201–24. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences.

Vadetskaya, E.B., N.V. Leontiev and G.A. Maximenkov 1980. *Pamyatniki okunevskoy kultury*. Leningrad: Russian Academy of Sciences.

Vadetskaya, E.B., A.V. Polyakov and N.F. Stepanova 2014. *Svod pamyatnikov afanasyevskoy kultury*. Barnaul: Azbuka.

Vainshtein, S.I. 1966. Pamyatniki vtoroy poloviny i tysyacheletiya v zapadnoy Tuve, in L.P. Potapov (ed.) *Trudy Tuvinskoy kompleksnoy arkheologo-etnograficheskoy ekspeditsii. Tom II. Materialy po etnografii i arkheologii rayonov basseyna r. Khemchik*: 292–347. Moscow and Leningrad: Russian Academy of Sciences.

Vainshtein, S.I. 1972. *Istoricheskaya etnografiya tuvintsev: problemy kochevogo khozyaystva*. Moscow: Russian Academy of Sciences.

Vainshtein, S.I. 1980. *Nomads of South Siberia: The Pastoral Economies of Tuva*. Cambridge: Cambridge University Press.

Vainshtein, S.I. 1991. *Mir kochevnikov tsentra Azii*. Moscow: Russian Academy of Sciences.

Vainshtein, S.I. and V.P. Diakonova 1966. Pamyatniki v mogilnike Kokel kontsa 1 tys. do n.e. – pervykh vekov nashei ery, in L.P. Potapov (ed.) *Trudy Tuvinskoy kompleksnoy arkheologo-etnograficheskoy ekspeditsii II. Materialy po etnografii i arkheologii rayonov basseyna r. Khemchik*: 185–291. Moscow and Leningrad: Russian Academy of Sciences.

Vakhtina, M.Yu. 2000. Grecheskaja stolovaja keramika VI v. do n.e. iz raskopok Nemirovskogo gorodischa v Pobuzhje, in V.Yu. Zuev (ed.) ΣΨΣΣΙΤΙΑ*: In Memory of Y.V. Andreev*: 209–17. St. Petersburg: State Hermitage Museum and 'Aleteja'.

Vakhtina, M.Yu. 2007. Greek Archaic Orientalising Pottery from the Barbarian Sites of the Forest-steppe Zone of the Northern Black Sea Coastal Region, in V. Gabrielson and J. Lund (eds) *The Black Sea in Antiquity: Regional and Interregional Economic Exchanges*: 23–38. Aarhus: Aarhus University Press.

Valikhanov, Tch. 1984. Dnevnik poezdki na Issyk kul, in Tch. Valikhanov (ed.) *Sobranie sotchinenii v piyati tomah*: vol. 1, 306–57. Alma-Ata: Kazakhskaiya Sovetskaiya entsiklopediya.

Van Andel, T., E. Zanagger and A. Demitrack 1990. Land Use and Soil Erosion in Prehistoric and Historical Greece. *Journal of Field Archaeology* 17/4: 379–96.

Vanden Berghe, I., M. Gleba and U. Mannering 2009. Towards the identification of dyestuffs in Early Iron Age Scandinavian peat bog textiles. *Journal of Archaeological Science* 36: 1910–21.

Van Geel, B., N.A. Bokovenko, N.D. Burova, K.V. Chugunov, V.A. Dergachev, V.G. Dirksen, M. Kulkova, A. Nagler, H. Parzinger, J. Van Der Plicht, S.S. Vasiliev and G.I. Zaitseva 2004. Climate change and the expansion of the Scythian culture after 850 BC: a hypothesis. *Journal of Archaeological Science* 31: 1735–42.

Van Gelder, G.J. 2000. *God's Banquet. Food in Classical Arabic Literature*. New York: Columbia University Press.

Van Gennep, A. 2002. *Obryady perekhoda: Sistematicheskoe Izuchenie Obryadov*. Moscow: Vostochnaya Literatura.

Varfolomeev, V.V. 2013. Keramika superstratnogo oblika iz pamyatnikov Begazy-Dandybayevskoy kultury, in A.Z. Beisenov (ed.) *Begazy-dandybayevskaya kultura Stepnoy Evrazii. Sbornik nauchnykh statey, posvyashchennyy 65-letiyu ZH. Kurmankulova*: 167–97. Almaty: Institute of Archaeology.

Vasiliev, V. 1980. *Sciții agatîrși pe teritoriul României*. Cluj-Napoca: 'Dacia'.

Vasilieva, E.E. 2012. Pogrebalny kompleks alanskoy kultury na Severnom Kavkaze: vtoraya polovina V – pervaya polovina VI veka n.e., in M.B. Piotrovsky (ed.) *Kochevniki Evrazii na puti k imperii. Iz sobraniya gosudarstvennogo Ermitazha*: 176–79. St. Petersburg: 'Slavia'.

Vatandoust, A., H. Parzinger and B. Helwing (eds) 2011. *Early mining and metallurgy on the western Central Iranian Plateau. The first five years of work* (Archäologie in Iran und Turan 9). Mainz am Rhein: Philipp von Zabern.

Ventresca Miller, A., J. Johnson, S. Makhortykh, L. Litinova, T. Taylor, R. Rolle and C. Makarewicz 2019. Mobility and diet in the Iron Age Pontic forest-steppe: A multi-isotopic study of urban populations at Bel'sk. *Archaeometry* 61/6 (December): 1399–1416. [https://doi:10.1111/arcm.12493]

Verhecken, A. and J. Wouters 1988/89. Coccid Insect Dyes. Historical, Geographical and Technical Data. *Bulletin KIK/IRPA* 22: 207–38. Brussels.

Vernadsky, G. 1946. *Ancient Russia* (A History of Russia I). New Haven: Yale University Press (third edition).

Vernadsky, G. 1959. *The Origins of Russia*. Oxford: Clarendon Press.

Vernadsky, G. 1968. *A History of Russia*. New Haven: Yale University Press (sixth edition).

Verri, G., D. Saunders, J. Ambers and T. Sweek 2010. Digital mapping of Egyptian blue: conservation implications, in C. Rozeik, A. Roy and D. Saunders (eds) *Conservation and the eastern Mediterranean: contributions to the Istannbul Congress, 20–24 September 2010*: 220–24. London: International Institute for Conservation of Historic and Artistic Works.

Vertienko, G.B. 2014*a*. Kontsept veprya v molodoavestiyskykh tekstakh. *Movni i kontseptualni kartyny svitu* 50: 140–48.

Vertienko, G.B. 2014*b*. Obraz veprya v iranskoy traditsii – narrativ i vizualizatsiya. *Stratum plus* 2014/3: 271–80.

Vetchinkin, A.R. 1966. *Estestvennye organicheskie krasyashchie veshchestva*. Saratov: Volga Book Press.

Vika, E. 2011. Diachronic dietary reconstructions in ancient Thebes, Greece: Results from stable isotope analyses. *Journal of Archaeological Science* 38: 1157–63.

Vinogradov, A.V. and E.E. Kuzmina 1970. Liteynyye formy iz Lyavlyakana. *Sovetskaya Arkheologiya* 1970/2: 125–35.

Vinokurov, N.I. 2002. Novye izobrazheniya vsadnikov na Bospore, in A.A. Maslennikov (ed.) *Drevnosti Bospora. Mezhdunarodny ezhegodnik po istorii, arkheologii, epigrafike, numizmatike i filologii Bospora Kimmeriyskogo* 5: 70–86. Moscow: Institute of Archaeology, Russian Academy of Sciences.

Vitt, V.-O. 1952. Loshady pazyrykskikh kurganov. *Sovetskaya Arkheologiya* 1952/16: 163–205.

Vladimirtsov, B.Ja. 1934. *Obshchestvennyj stroj mongolov; mongol'skoj kochevoj feodalizm*. Leningrad: Akademija nauk Sojuza Sovetskikh Sotsialisticheskikh Respublik (French translation by M. Carsow: *Le régime social des Mongols: le féodalisme nomade*, Paris: Maisonneuve, 1948).

Vogelsang-Eastwood, G. 1993. *Pharaonic Egyptian Clothing*. Leiden: E.J. Brill.

Vogelsang-Eastwood, G. 1999. *Tutankhamun's Wardrobe*. Leiden: TRACHT.

Vogelsang, W. 1992. *The Rise and Organisation of the Achaemenid Empire: the Eastern Evidence*. Leiden: E.J. Brill.

Vogelsang, W. 2008. Scythian horsemen; Northern rulers, in W. Vogelsang *The Afghans*: 81–95, 136–57. Oxford: Wiley-Blackwell.

Vogelsang, W. 2010. Trouser Wearing by Horse-Riding Nomads in Central Asia, in G. Vogelsang-Eastwood (ed.) *Berg Encyclopaedia of World Dress and Fashion, 5: Central and Southwest Asia*: 349–45. Oxford: Berg.

Vogt, B. 1996. Bronze Age maritime trade in the Indian Ocean: Harappan traits on the Oman Peninsula, in J. Reade (ed.) *The Indian Ocean in antiquity*: 107–32. London: Kegan Paul International.

Volkov, V.V. 2002. *Olenniye kamni Mongolii*. Moscow: Russian Academy of Sciences.

von Gall, H. 1990. *Das Reiterkampfbild in der iranischen und iranisch beeinflüssten Kunst parthischer und sasanidischer Zeit*. Berlin: Gebr. Mann.

Von Gall, H. 2002. Das Motiv des 'Reiters mit dem Knappen' auf den bosporanischen Grabstelen. *Archäologische Mitteilungen aus Iran und Turan* 34: 397–413.

Von Hinüber, O. 1991. Expansion to the north: Afghanistan and Central Asia, in H. Bechert and R. Gombrich (eds) *The World of Buddhism: Buddhist Monks and Nuns in Society and Culture*: 99–107. London: Thames and Hudson.

Von Hinüber, O. 2011. Four donations made by Maṅgalahaṃsikā, queen of Palola (Gilgit). *Annual Report of the International Research Institute for Advanced Buddhology at Soka University for the Academic Year 2010* 14: 3–6.

Von May, E. 1985. Widerristhöhe und Langknochenmasse bei Pferden – ein immer noch aktuelles Problem. *Zeitschrift für Säugetierkunde* 50/6: 368–82.

Vorobieva, M.G. 1973. *Dingil'dzhe. Usadva Seredini I Tisyacheletya do n.e. v. drevnem Khorezme*. Moscow: Soviet Academy of Sciences.

Voroniatov, S. 2012*a*. Sarmatische Elemente im Inventar des Königsgrabs von Mušov in Südmähren. *Eurasia Antiqua* 18: 185–95.

Voroniatov, S. 2012*b*. Oselki Sarmatskii tamgam, in V.A. Alekshin *et al.* (eds) *Kultury stepnoy Evrazii i ikh vzaimodeystviye s drevnimi tsivilizatsiyami. Materialy mezhdunarodnoy nauchnoy konferentsii, posvyashchennoy 110-letiyu so dnya rozhdeniya M.P. Gryaznova*: vol. 1, 54–58. St. Petersburg: 'Periphery' and Institute of the History of Material Culture, Russian Academy of Sciences.

Voroniatov, S. 2013. O naznachenii sarmatskikh tamg v tseremonialnom konskom snaryazhenii in M.Yu. Vakhtina, E.V. Gritsik, N.K. Zhizhina, S.V. Kashayev, N.A. Pavlichenko, O.Yu. Sokolova and V.A. Khrshanovskiy (eds) *Bosporskiy fenomen. Greki i varvary na evrazijskom perekrestke.* Materialy mezhdunarodnoy nauchnoy konferentsii (St. Petersburg, 19–22 noyabrya 2013 g.): 296–302. St. Petersburg: Nestor-Istoriya.

Vos, M.F. 1963. *Scythian Archers in Archaic Greek Vase-Painting*. Groningen: J.B. Wolters.

Vujovic, M.B. 1995. Deo okova rimskogo sedla iz Boljetina. *Glasnik Sad* 10: 118–23.

Vulf, E.V. and O.F. Maleeva 1969. Mirovye resursy poleznykh rasteniy. *Trudy BIN im. V.L. Komarova AN SSSR*. Leningrad: Russian Academy of Sciences.

Vulpe, A. 1967. *Necropola hallstattiană de la Ferigile. Monografie arkheologică* (Biblioteca de arkheologie 9). Bucharest: ARSR.

Vulpe, A. 1990. *Die Kurzschwerter, Dolche und Streitmesser der Hallstattzeit in Rumänien* (Prähistorische Bronzefunde 6/9). Munich: C.H. Beck.

Vuissoz, A., M. Worobey and N. Odegaard 2007. The survival of PCR-amplifiable DNA in cow leather. *Journal of Archaeological Science* 34/5: 823–29.

Vyazmitina, M.I. 1962. *Zolota Balka. Poselennja sarmats'-kogo chasu na Nizhn'omu Dnipri*. Kiev: AN URSR.

Wagner, M. and H. Butz 2007. *Nomadenkunst: Ordosbronzen der Ostasiatiischen Kunstsammlung, Museum für Asiatische Kunst, Staatlische Museen zu Berlin*. Mainz am Rhein: Philipp von Zabern.

Wagner, M., Wu Xinhua, P. Tarasov, A. Aisha, C.B. Ramsey and M. Schultz 2011. Radiocarbon-dated archaeological record of early first millennium B.C. mounted pastoralists in the Kunlun Mountains, China. *Proceedings of the National Academy of Sciences of the United States of America* 108/38: 15733–38.

Walker, P.L., R.R. Bathurst, R. Richman, T. Gjerdrum and V.A. Andrushkp 2009. The causes of porotic hyperostosis and cribra orbitalia: a reappraisal of the iron-deficiency-anemia hypothesis. *American Journal of Physical Anthropology* 139: 109–25.

Walser, G. 1966. *Die Völkerschaften auf den Reliefs von Persepolis* (Teheraner Forschungen 2). Berlin: Gebr. Mann.

Walter, M. 2014. Buddhism in Central Asian History, in M. Poceski (ed.) *The Wiley Blackwell Companion to East and Inner Asian Buddhism*: 21–39. Chichester: Wiley Blackwell.

Wang Binghua 1987. Recherches historiques préliminaires sur les Saka du Xinjiang ancien. *Arts Asiatiques* 42: 31–44.

Wang Binghua (ed.) 1999. *Xinjiang gushi: gudai Xinjiang jumin ji qi wenhua* [The ancient corpses of Xinjiang: the peoples of ancient Xinjiang and their culture]. Wulumuqi: Xinjiang renmin chubanshe.

Wang Bo 2016. *Textile Treasures of Zaghunluq*. Riggisberg: Abegg-Stiftung / Beijing: Cultural Relics Press.

Wang, E. 2012. What happened to the First Emperor's afterlife spirit?, in Liu Yang (ed.) *China's Terracotta Warriors: The First Emperor's Legacy*: 51–87. Minneapolis: Minneapolis Institute of Arts.

Wang, H. 2004. *Money on the Silk Road: the evidence from Eastern Central Asia to c. AD 800*. London: The British Museum Press.

Wang Hui 2009. Zhangjiachuan Majiayuan mudi xiangguan wenti chutan [On the issues relevant to the Majiayuan cemetery in Zhangjiachuan county]. *Wenwu* 10: 70–77.

Wang Hui 2011. On the issues relevant to the Majiayuan Cemetery in Zhang-jiachuan County. *Chinese Archaeology* 11/1: 60–64 [= English translation of Wang Hui 2009].

Gansu Sheng Wenwu Kaogu Yanjiusuo (ed.) 2014. *Arkheologicheskie nakhodki zapadnykh zhunov perioda Chzhan'go po materialam mogilnika Matszyayuan [Archaeological finds of the western Zhun Zhangguo on the materials]*. Beijing: Wenwu Chubanshe.

Wang Shilan and Xu Qizhi 1988. Mahanshan diqu Quanxinshi baofen zuhe tezheng ji gu zhibei de yanbian guilu [Characteristics of spore-pollen assemblages of the Holocene in the Mahanshan region and the change of palaeovegetation]. *Lanzhou daxue xuebao (ziran kexue)* 2: 113–21.

Wang Wei 1997. Cong chutu maju kan san zhi liu shiji dong Ya zhuguo de jiaoliu [Exchanges between the east Asian countries in the 3rd–6th centuries in the light of excavated harness]. *Kaogu* 12: 66–84.

Watrous, S.D. (ed.) 1966. *John Ledyard's journey through Russia and Siberia. 1787–1788. The journal and selected letters*. Madison [WI]: University of Wisconsin Press.

Weber, M. 1921. *Wirtschaft Und Gesellschaft*. Tübingen: J.C.B. Mohr and P. Siebeck.

Wegener, R. 2010. *Sauromatisches und sarmatisches Fundgut nordöstlich und östlich des Kaspischen Meeres. Eine Bestandsaufnahmen bisheriger Forschungen unter besonderer Berücksichtigung der Waffengräber* (BAR International Series 2072). Oxford: British Archaeological Reports.

Weinberg, G. 1983. A Hellenistic Glass Factory on Rhodes: Progress Report. *Journal of Glass Studies* 25: 37.

Wentz, R.K. and N.T. de Grummond 2009. Life on Horseback: Palaeopathology of Two Scythian Skeletons from Alexandropol, Ukraine. *International Journal of Osteoarchaeology* 19: 107–15.

Wertime, T. 1983. The Furnace versus the Goat: The Pyrotechnologic Industries and Mediterranean Deforestation in Antiquity. *Journal of Field Archaeology* 10/4: 445–52.

Whitcomb, D.S. 1985. *Before the Roses and Nightingales. Excavations at Qasr-i Abu Nasr, Old Shiraz*. New York: Metropolitan Museum of Art.

Whitehouse, D. 1975. Carnelian in the Persian Gulf. *Antiquity* 49: 129–30.

Whitfield, S. 2018. *Silk, Slaves, and Stupas: material culture of the Silk Road*. Oakland: University of California Press.

Whitworth, D. 2017. In search of the ancient Scythians, scourge of civilisations. *The Times* Saturday Review 2nd September: 8–9.

Widengren, G. 1956. Some Remarks on Riding Costume and Articles of Dress among Iranian Peoples in Antiquity. *Arctica: Studia Ethnographica Upsaliensia* 11: 228–76.

Widengren, G. 1965. *Die Religionen Irans* (Die Religionen der Menschheit 14). Stuttgart: Kohlhammer.

Wieczorek, A. and C. Lind (eds) 2007. *Ursprünge der Seidenstraße. Sensationelle Neufunde aus Xinjiang, China*. Stuttgart and Mannheim: Theiss and Reiss-Engelhorn-Museen.

Wiesehöfer, J. 2007. *Ancient Persia: from 550 BC to 650 AD*. London: I.B. Tauris (new edition).

Wiesehöfer, J. 2016. Greeks, Iranians and Chinese on the Silk Road, in S.N.C. Lieu and G.B. Mikkelsen (eds) *Between Rome and China: History, Religion and Material Culture of the Silk Road*: 1–17. Turnhout: Brepols.

Wild, J.P. 1977. Classical Greek textiles from Nymphaeum. *Textile Museum Journal* 4/4: 33–34.

Williams, D. (ed.) 1998. *The Art of the Greek Goldsmith*. London: British Museum Press.

Williams, D. and J. Ogden 1994. *Greek Gold. Jewellery from the Classical World*. London: British Museum Press.

Windfuhr, G. 2000. The Iranians and the Sarmatians: a note on terminology, in J. Aruz, A. Farkas, A. Alekseev and E. Korolkova (eds) *The Golden Deer of Eurasia: Scythian and Sarmatian treasures from the Russian steppes, The State Hermitage, St. Petersburg, and the Archaeological Museum, Ufa*: 19–20. New York: Metropolitan Museum and Yale University Press.

Winter, I. 1999. The Aesthetic Value of Lapis Lazuli in Mesopotamia, in A. Caubet (ed.) *Cornaline et pierres précieuses. La Méditerranée, de l'Antiquité à l'Islam. Actes du colloque organise au muse du Louvre par le Service culturel les 24 et 25 novembre 1995*: 43–58. Paris: La Documentation française and Musée du Louvre.

Wolf, E. 1982. *Europe and the People Without History*. Berkeley: University of California Press.

Wölfflin, H. 2004. *Renessans i barokko*. St. Petersburg: 'Azbuka-klassika'.

Wolski, J. 1993. *L'empire des Arsacides* (Acta Iranica 32). Louvain: Peeters.

Womersley, D. (ed.) 2005. *Edward Gibbon, The History of the Decline and Fall of the Roman Empire: Volume the First (1776) and Volume the Second (1781)*. London: Penguin (revised reprint).

Wong, R. 2017. Carpets, Chariots and the State of Qin. *Orientations* 48: 60–70.

Wood, F. 2003. *The Silk Road: two thousand years in the heart of Asia*. London: The British Library.

Woolley, C.L. 1934. *Ur Excavations, volume II: The Royal Cemetery*. London and Philadelphia: Trustees of the British Museum and Museum of the University of Pensylvania.

Woolley, C.L. 1962. *Ur Excavations, volume IX: The Neo-Babylonian and Persian periods*. London and Philadelphia: Trustees of the British Museum and Museum of the University of Pensylvania.

Wouters, J. 1985. High-performance liquid chromatography of anthraquinones: analysis of plant and insect extracts and dyed textiles. *Studies in Conservation* 30: 119–28.

Wouters, J. 1990. Dyestuff analysis of scale insects by high-performance liquid chromatography. *Proceedings of the Sixth International Symposium of Scale Insect Studies* 6/2: 61–70. Krakow: Agricultural University Press.

Wu Hsiao-yan 2013. *Chariots in Early China. Origins, Cultural Interaction and Identity* (BAR International Series 2457). Oxford: Archaeopress.

Wu Xin 2005. Central Asia in the context of the Achaemenid Persian Empire. Unpublished PhD dissertation, University of Pennsylvania.

Wu Xin 2010. Enemies of Empire: A Historical Reconstruction of Political Conflicts between Central Asia and the Persian Empire, in J. Curtis and St J. Simpson (eds) *The World of Achaemenid Persia. History, Art and Society in Iran and the Ancient Near East*: 545–63. London: I.B. Tauris.

Wu Xin 2012. Violence and Power Visualized: Representations of Military Encounters between Central Asia and the Achaemenid Persian Empire, in C.W. Hartley, G. Bike Yazicioglu and A.T. Smith (eds) *The Archaeology of Power and Politics in Eurasia: Regimes and Revolutions*: 78–90. Cambridge: Cambridge University Press.

Wu Xin 2014. 'O Young Man ... Make known of What Kind You Are': Warfare, History, and Elite Ideology of the Achaemenid Persian Empire. *Iranica Antiqua* 49: 209–99.

Wu Xiaolong 2013. Cultural Hybridity and Social Status: Elite Tombs on China's Northern Frontier during the Third Century BC. *Antiquity* 87/335: 121–36.

Xinjiang, R. 2013. Lecture 4. The nature of the Dunhuang library cave and its sealing, in I. Galambos (trans) Eighteen Lectures on Dunhuang: 109–36. Leiden: E.J. Brill.

Xinjiang Weiwu'er Zizhiqu Bowuguan, Akesu Wenguansuo, Wensu Wenhuaguan 1986. Wensu Xian Baozidong muzangqun de diaocha he fajue [Survey and excavation of the cemetery at Baozidong, Wensu County]. *Xinjiang wenwu* 2: 1–22.

Xinjiang Weiwu'er Zizhiqu Bowuguan and Xinjiang Wenwu Kaogu Yanjiusuo 2001. *Zhongguo Xinjiang Shanpula: gudai Yutian wenming de jieshi yu yanjiu* [*Sampula in Xinjiang of China: revelation and study of ancient Khotan civilization*]. Xinjiang: Xinjiang renmin chubanshe.

Xinjiang 2001. *Sampula in Xinjiang of China. Revelation and Study of Ancient Khotan Civilization*. Urumqi: Xinjiang People's Press.

Xinjiang Wenwu Kaogu Yanjiusuo 2001. *Jiaohe gouxi: 1994–1996 niandu kaogu fajue baogao* Jiaohe gouxi: the archaeological excavation report from 1994 to 1996]. Wulumuqi: Xinjiang renmin chubanshe.

Xu Yongjie and Guo Chenhui 1986. Qin'an Xian linian chutu de beifangxi qingtongqi [The northern bronzes discovered from Qin'an county over the years]. *Wenwu* 2: 40–42.

Xuzhou Bowuguan 1999. Xuzhou Neihua faxian Nanbeichao taoyong [Northern and Southern dynasties pottery figurines discovered at Neihua, Xuzhou]. *Wenwu* 3: 19–24.

Yablonsky, L.T. 2000. 'Scythian Triad' and 'Scythian World', in J. Davis-Kimball, E. Murphy, L. Koryakova and L. Yablonsky (eds) *Kurgans, Ritual Sites, and Settlements: Eurasian Bronze and Iron Age* (BAR International Series 890): 3–12. Oxford: Archaeopress.

Yablonsky, L.T. 2010. *Prokhorovka. U istokov sarmatskoy arheologii*. Moscow: Taus.

Yablonsky, L.T. 2013. *Zoloto sarmatskikh vozhdeii. Elitnyy nekropol' Filippovka 1 (po materialam raskopok v period s 2004 po 2009 gold). Katalog kollekstii, I*. Moscow: Institute of Archaeology, Russian Academy of Sciences.

Yablonsky, L.T. 2015. Novyye neobyknovennyye nakhodki iz kurgana 1 mogil'nika Filippovka-1. *Arkheologiya, Etnografiya i Antropologiya Evrazii* 43 (2015/2): 97–108.

Yablonsky, L.T. 2017. The Discovery of a Sarmatian Tattoo Toolkit in Russia, in L. Krutak and A. Deter-Wolf (eds) *Ancient Ink: The Archaeology of Tattooing*: 215–30. Seattle and London: University of Washington Press.

Yablonsky, L. and A. Balachvancev 2013. Frühe Nomaden des südlichen Ural Vorlands anhand archäologischer Daten und narrative Quellen, in M. Treister and L. Yablonsky (eds) *Einflüsse der achämenidischen Kultur* im südlichen Uralvorland (5.–3. Jh. v. Chr.): 22–34. Vienna: Phoibus Verlag.

Yablonsky, L.T. and D.V. Meshcheryakov 2007. Raskopki 'carskogo' kurgana v Filippovke (predvatitelnoe soobshchenie). *Rossiyskaya Arkheologiya* 2007/2: 55–62.

Yablonsky, L.T. and M.Yu. Treister 2019. New Archaeological Data on Achaemenid Influences in the Southern Urals. *Ancient Civilizations from Scythia to Siberia* 25/1: 59–78.

Yablonsky, L.T. (ed.) 2008. *Sokrovishcha sarmatskih vozhdej (materialy raskopok Filippovskih kurganov)*. Orenburg: Dimur Press.

Yan Shizhong and Li Huairen 1992. Ningxia Xiji faxian yizuo qingtong shidai muzang [A newly discovered tomb from the Bronze Age in Xiji, Ningxia]. *Kaogu* 6: 573–74.

Yang Hong 1985. Xinluo Tianma Zhong maju fuyuan yanjiu – jiantan Zhongguo gudai maju dui Haidong de yingxiang [Views on the reconstruction of the harness from the 'Tianma Tomb' in Silla – on the spread of the influence of the ancient Chinese horse harness to the Orient]. *Kaogu yu wenwu* 2: 87–95.

Yang Jianhua 2004. *Chunqiu Zhanguo shiqi Zhongguo beifang wenhuadai de xingcheng* [The formation of Northern China cultural belt in the Spring and Autumn period and the Warring States period]. Beijing: Wenwu chubanshe.

Yang, Jianhua and K.M. Linduff 2013. A contextual explanation for 'foreign' or 'steppic' factors exhibited in burials at the Majiayuan cemetery and the opening of the Tianshan Mountain Corridor. *Journal of East Asian Archaeology* 1: 73–84.

Yang Ningguo and Qi Yuezhang 1999. Ningxia Pengyang Xian jinnian chutu de beifangxi qingtongqi [Bronzes of the Northern System recently unearthed from Pengyang County, Ningxia]. *Kaogu* 12: 28–37.

Yang Yueguang and Mao Ruilin 2015. Gansu Zhang Xian Dunping yizhi Dongzhou mudi [*The cemetery at Dunping in Zhang County, Gansu, of the Eastern Zhou period*]. *Dazhong kaogu* 2: 12–13.

Yarshater, E. 1983. Iranian national history, in E. Yarshater (ed.) *The Cambridge History of Iran: the Seleucid, Parthian and Sasanian Periods*: vol. 3/1, 359–478. Cambridge: Cambridge University Press.

Yashchenko, R.V. and A.A. Ambartsumyan 1999. O probleme karmina s tochki zreniya entomologa i filologa. *TETHYS Entomological Research* 1: 47–58. Almaty: TETHYS.

Yassine, K. 1984. *Tell el Mazar I: Cemetery A*. Amman: University of Jordan.

Yatsenko, S.A. 2001. Costume of the Yuech-Chichs. *Silk Road Art and Archaeology* 7: 73–120.

Yatsenko, S.A. 2006. *Kostyum drevney Eurasii: iranoyazychnyye narody*. Moscow: 'Oriental Literature', Russian Academy of Sciences.

Yatsenko, S.A. 2011. Clothing, vii. Of the Iranian Tribes on the Pontic Steppes and in the Caucasus. *Encyclopaedia Iranica* 7: 758–60. viewed 27th March 2018, <http://www.iranicaonline.org/articles/clothing-vii>.

Yetts, W.P. 1926*a*. Report on the Expeditions to Study Northern Mongolia Associated with the Mongol–Tibetan Expedition of P.K. Kozlóv by P.K. Kozlóv, S.A. Teploúkhov, G.I. Boróvka, B.B. Polýnov and V.I. Kryzhanóvski. *The Journal of the Royal Asiatic Society of Great Britain and Ireland* 1926/3: 555–57.

Yetts, W.P. 1926*b*. Discoveries of the Kozlóv Expedition. *The Burlington Magazine for Connoisseurs* 48/277 (April): 168–69, 172–77, 180–82, 185.

Yetts, W.P. 1929*a*. Chinese art in Berlin. *The Burlington Magazine for Connoisseurs* 54/312 (March): 128, 132–35, 139.

Yetts, W.P. 1929*b*. Exhibition of Chinese Art in Berlin. *The Journal of the Royal Asiatic Society of Great Britain and Ireland* 1929/2: 337–39.

Yevdokimov, G.L. and V.Yu. Murzin 1984. Ranneskifskoe pogrebenie s oruzhiem iz Khersonskoy oblasti, in E.V. Chernenko (ed.) *Vooruzhenie skifov i sarmatov*: 75–82. Kiev: 'Naukova Dumka'.

Young, R.S. 1956. The Campaign of 1955 at Gordion: Preliminary Report. *American Journal of Archaeology* 60/3 (July): 249–66.

Young, R.S. 1962. The 1961 Campaign at Gordion. *American Journal of Archaeology* 66/2 (April): 153–68.

Yu Yingshi 1967. *Trade and Expansion in Han China*. Berkeley: University of California Press.

Yuan Zhongyi 1990. *Qin Shihuang ling bingmayong yanjiu* [A study of terracotta warriors and horses of Qin Shihuang mausoleum]. Beijing: Wenwu chubanshe.

Yule, P. 2001. *Die Gräberfelder in Samad al Shān (Sultanat Oman). Materialien zu einer Kulturgeschichte* (Orient-Archäologie 4). Rahden: Marie Leidorf (two volumes).

Yusupova, T.I. 2011. Istoriya ne sovsem obychnogo arkheologicheskogo otkrytiya, in N.V. Polosmak, E.S. Bogdanov and D. Tseveendorj (eds) *Dvadtsa noin-ulinsky kurgan*: 9–52. Novosibirsk: Infolio Press.

Zabelin, I.E. 1872*a*. *Drevnosti Gerodotovoi Skifii. Sbornik opisanii arkheologicheskikh raskopok I nakhodok v Chernomorskikh stepjakh* (Materialy i issledovanija po arkheologii Rossii). St. Petersburg: Imperial Academy of Science.

Zabelin, I.E. 1872*b*. *Drevnosti Gerodotovoi Skifii. Sbornik opisanii arkheologicheskikh raskopok i nakhodok v Chernomorskikh stepjakh* (Materialy i issledovanija po arkheologii Rossii). St. Petersburg: Imperial Academy of Science.

Zadnikov, S. 2009. Antichnaja keramika tretjei chetverti VII v. do n.e. iz raskopok na Bel'skom gorodische, in V.P. Kopylov (ed.) *Mezhdunarodnye otnoshenija v basseine Chernogo morja v skifo-antichnoe i hazarskoe vremja: sbornik statei po materialam XII mezhdunarodnoi nauchnoi konferentsii*: 15–21. Rostov-on-Don: Rostov Pedagogical Institute.

Zaitsev, Yu.P. 2003. *Neapol' skifskij (II v. do n.e. – III v. n.e.)*. Simferopol: Universum.

Zaitsev, Yu.P. 2012*a*. Antichnaya keramika v ritualnyh (votivnyh) kladah Severnogo Prichernomorya, in *Drevnosti Severnogo Prichernomorya III–II vv. do n.e.*: 55–66. Tiraspol: OOO 'Remont vychislitel'noj tehniki'.

Zaitsev, Yu.P. 2012*b*. Severnoe Prichernomore v III–II vv. do n.e.: ritualnye klady i arkheologicheskie kultury (postanovka problemy), in *Drevnosti Severnogo*

Prichernomorya III–II vv. do n.e.: 67–72. Tiraspol: OOO 'Remont vychislitelnoy tekhniki'.

Zaitsev, Yu.P. 2013. Neapol' Skifskiy – Ak-Kaya – Pantikapey: varvary Kryma i Bospor v II–I vv. do n.e., in M.Yu. Vakhtina, E.V. Gritsik, N.K. Zhizhina, S.V. Kashayev, N.A. Pavlichenko, O.Yu. Sokolova and V.A. Khrshanovskiy (eds) *Bosporskiy fenomen. Greki i varvary na evraziyskom perekrestke*: 499–506. St. Petersburg: Nestor-Istoriya.

Zaitsev, Yu.P. 2014. Fortifikaciya kreposti Ak-Kaja / Vishennoe v Centralnom Krymu, in *Voyna i voennoe delo v skifo-sarmatskom mire. Materialy Mezhdunarodnoy nauchnoy konferentsii, posvyaschennoy pamynati A.I. Melyukovoy (Kagalnik, 26–29 aprelya 2014 g.)*: 53–54. Rostov-on-Don: JuNC RAN.

Zaitsev, Yu.P. 2015. Oboronitelnye sooruzheniya kreposti Ak-Kaya v Centralnom Krymu (epokha ellinizma i rimskiy period), in D.V. Zhuravlev (ed.) *Mitridata duet veter. Bospor i Prichernomore v antichnuju jepohu. K 70-letiyu V.P. Tolstikova*: 164–73. Moscow: Russian Academy of Sciences.

Zaitsev, Yu.P. and S.G. Koltukhov 2016. Kurgan s kollektivnymi pogrebeniyami III–I vv. do n.e. iz nekropolya Ak-Kaya / Besh-Oba v Krymu. *Stratum plus* 2016/3: 99–127.

Zaitsev, Ju.P., V.I. Mordvintseva and K. Hellstrjöm 2013. Radiouglerodnoe datirovanie zhenskogo yelitnogo pogrebeniya Nogaychinskogo kurgana (Krym) v kulturno istoricheskom kontekste, in I.N. Khrapunov (ed.) *Krym v sarmatskuyu epokhu (II v. do n.e.–IV v. n.e.)*: vol. I, 44–59. Simferopol and Bahchisaray: 'Dolya'.

Zaitseva, G.I. and N.A. Bokovenko (eds) 2005. *Evrazii v skifskuyu epokhu. Radiouglerodnaja i arkheologicheskaya khronologiya*. St. Petersburg: 'Teza'.

Zaitseva, G.I. and M.A. Kulkova (eds) 2007. *Radiouglerod v arkheologicheskikh i paleoekologicheskikh issledovaniyakh. Materialy konferentsii, posvyashchennojy50-letiyu radiouglerodnoy laboratorii IIMK RAN 9–12 aprelya 2007 g., Sankt-Peterburg*. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Science and 'Teza'.

Zaitseva, G.I., N.A. Bokovenko, A.Yu. Alekseev, K. Chugunov and E.M. Scott (eds) 2007. *Evrazija v skifskuju epokhu. Radiouglerodnaja i arkheologicheskaja khronologiya*. St. Petersburg: 'Teza'.

Zaitseva, G.I., K.V. Chugunov, N.A. Bokovenko, V.A. Dergachev, V.G. Dirksen, B. Van Geel, M.A. Koulkova, L.M. Lebedeva, A.A. Sementsov, J. Van Der Plicht, E.M. Scott, S.S. Vasiliev, K.I. Lokhov and N. Bourova 2005. Chronological study of Archaeological Sites and Environmental Change around 2600 BP in the Eurasian Steppe Belt (Uyuk Valley, Tuva Republic). *Geochronometria* 24: 97–107.

Zaitseva, G.I., K.V. Chugunov, A.Yu. Alexeev, V.A. Dergachev, S.S. Vasiliev, A.A. Sementsov, G.T. Cook, E.M. Scott, H. van der Plicht, N.A. Bokovenko, M.A. Kulkova, N.D. Burova, L.M. Lebedeva, H. Junger and E. Sonninen 2007. Istoriya i rezultaty radiouglerodnogo datirovaniya kurgana Arzhan, in *Radiouglerod v arkheologicheskikh i paleoekologicheskikh issledovaniyakh (Materialy konferentsii, posvyashchennoy 50-letiyu radiouglerodnoy laboratorii IIMK RAN, 9–12 aprelya 2007)*: 51–262. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Sciences.

Zaitseva, G.I., N.A. Dubova, A.A. Semenov, P. Raymar, J. Mallory and X. Jünger 2008. Radiouglerodnaya khronologiya pamyatnika Gonur Depe. *Trudy Margianskoy Arkheologicheskoy Ekspeditsii* 2: 166–79.

Zaitseva, G.I., K.V. Chugunov, H. Parzinger, A. Nagler, V.A. Dergačev, M. Scott, A.A. Semencov, S.S. Vasiliev, B. van Geel, J. van der Plicht and L.M. Lebedeva 2010. Die Radiokarbondaten, in K. Chugunov, H. Parzinger and A. Nagler (eds) *Der skythenzeitliche Fürstenkurgan Aržan 2 in Tuva* (Archäologie in Eurasien 26 / Steppenvölker Eurasiens 3): 169–76. Mainz am Rhein: Philipp von Zabern.

Zanoci, A. 1998. *Fortificațiile geto-dacice din spațiul extracarpatic în secolele VI–III a. Chr*. Bucharest: Vavil Edinf SRL.

Zaoqi Qin Wenhua Lianhe Kaogudui and Zhangjiachuan Huizu Zizhixian Bowuguan 2009. Zhangjiachuan Majiayuan Zhanguo mudi 2007–2008 nian fajue jianbao [2007–2008 excavations on Majiayuan cemetery of Warring States period in Zhangjiachuan, Gansu]. *Wenwu* 10: 25–51.

Zaoqi Qin Wenhua Lianhe Kaogudui and Zhangjiachuan Huizu Zizhixian Bowuguan 2010. Zhangjiachuan Majiayuan Zhanguo mudi 2008–2009 nian fajue jianbao [2008–2009 excavation of the Majiayuan graveyard of the Warring States in Zhangjiachuan]. *Wenwu* 10: 4–26.

Zaoqi Qin Wenhua Lianhe Kaogudui and Zhangjiachuan Huizu Zizhixian Bowuguan 2012. Zhangjiachuan Majiayuan Zhanguo mudi 2010–2011 nian fajue jianbao [Report of the 2010–2011 excavations at the Majiayuan cemetery of the Warring States period in Zhangjiachuan, Gansu]. *Wenwu* 8: 4–26.

Zasetskaya, I.P. 1994. *Kultura kochevnikov yuzhno-russkikh stepey v gunnskuyu epokhu (konets IV–V v.)*. St. Petersburg: Ellips Ltd.

Zasetskaya, I.P., M.M. Kazansky, I.R. Akhmedov and R.S. Minasyan 2007. *Morskoy Chulek. Pogrebeniya znati iz Priazovya i ikh mesto v istorii plemen Severnogo Prichernomorya v postgunnskuyu epokhu*. St. Petersburg: State Hermitage Museum.

Zawadzki, S. 2006. *Garments Of The Gods: Studies On The Textile Industry And The Pantheon Of Sippar According To The Texts From The Ebabbar Archive*. Munich: Vandenhoeck and Ruprecht.

Zeest, I.B. 1960. *Keramicheskaja tara Bospora* (Materialy i issledovanija po arkheologii SSSR = MIA 83). Moscow: Izdatelstvo Akademii Nauk SSSR.

Zeymal, E. 1999. Tillya-Tepe within the context of the Kushan chronology, in M. Alram and D.E. Klimburg-Salter (eds) *Coins, Art, and Chronology. Essays on the*

pre-Islamic History of the Indo-Iranian Borderlands: 239–44. Vienna: Austrian Academy of Sciences.

Zhao Deyun 2014. Study on the etched carnelian beads unearthed in China. *Chinese Archaeology* 14: 176–81.

Zhao Feng and Yu Zhiyong (eds) 2000. *Shamo wangzi yibao: Sichou Zhilu Niya yizhi chutu wenwu* [*Legacy of the desert king: textiles and treasures excavated at Niya on the Silk Road*]. Xianggang: Yishatang fushi gongzuodui.

Zhao Wucheng 2010*a*. Gansu Majiayuan Zhanguo mu mache de fuyuan – jiantan zushu wenti [The reconstruction of the chariots of the Warring States period in Majiayuan, Gansu]. *Wenwu* 6: 75–83.

Zhao Wucheng 2010*b*. Gansu Majiayuan Zhanguo mu mache de fuyuan (xuyi) [Reconstruction of the chariots from Warring States tombs at Majiayuan, Gansu (supplement 1)]. *Wenwu* 11: 84–96.

Zhelezchikov, B.F., V.M. Klepikov and I.V. Sergatskov 2006. *Drevnosti Lebedevki (VI-II vv. do n.e.)*. Moscow: 'Vostochnaya literatura' RAN.

Zhong Kan and Han Kongle 1983. Ningxia nanbu Chunqiu Zhanguo shiqi de qingtong wenhua [Bronze cultures of the Spring and Autumn and Warring States periods in southernn Ningxia], in Zhongguo Kaogu Xuehui (ed.) *Zhongguo Kaogu Xuehui disici nianhui lunwenji*: 203–13. Beijing: Wenwu chubanshe.

Zhong Ri Gongtong Niya Yiji Xueshu Kaochadui and Nitchū Kyōdō Niya Iseki Gakujutsu Chōsatai 1999. *Zhong Ri Ri Zhong gontong Niya xueshu diaocha baogao shu / Chū-Nichi Nitchū kyōdō Niya iseki gakujutsu chōsa hōkokusho* [The report of the Sino-Japanese Japanese-Chinese joint scholarly investigation into the Niya site, vol. 2]. Wulumuqi: Zhong ri gongtong Niya yiji xueshu kaochadui / Tokyo: Nitchū kyōdō Niya iseki gakujutsu chōsatai.

Zhongguo Lishi Bowuguan and Xinjiang Weiwu'er Zizhiqu Wenwuju (eds) 2002. *Tianshan gudao dongxi feng: Xinjiang Sichou Zhilu wenwu teji* [Special collection of antiquities from the Silk Road in Xinjiang]. Beijing: Zhongguo shehui kexue chubanshe.

Zhongguo Shehui Kexueyuan Kaogu Yanjiusuo Anyang Gongzuodui 1983. Anyang Xiaomintun Jin mu fajue baogao [Report on the excavations of a Jin dynasty grave in the village of Xiaomintun in Anyang]. *Kaogu* 6: 501–11.

Zhongguo Shehui Kexueyuan Kaogu Yanjiusuo Jishushi 1983. Anyang Jin mu maju fuyuan [Reconstruction of the accoutrements of a horse from a Jin dynasty burial in Anyang]. *Kaogu* 6: 554–59.

Zhongguo Sichou Bowuguan, Xinjiang Weiwu'er Zizhiqu Wenwu Kaogu Yanjiusuo 2013. *Hanhai chenzhou: Xinjiang Xiaohe mudi chutu maozhiwu zhengli yu yanjiu* [Buried past in the desert: textiles from the Xinjiang Small River cemetery]. Hangzhou: Zhongguo sichou bowuguan.

Zöllner, H., B. Ulrich and R. Rolle *et al.* 2007. Results of Geophysical Prospection in the Scythian Settlement of Belsk (Bol'šoe Belskoe Gorodišče), in A. Posluschny, K. Lambers and I. Herzog (eds) *Layers of Perception: Proceedings of the 35th International Conference on Computer Applications and Quantitative Methods in Archaeology (CAA) (Berlin, 2–6 April 2007)*: 25. Bonn: Rudolph Habelt.

Zotova, S.V. 1965. Kovrovye ornamenty andronovskoy keramiki. *Novoye v sovetskoy arkheologii*: 177–81.

Zuev, V.Yu. 1998*a*. Periodizatsiya arkheologicheskih pamyatnikov centralnoy chasti Evraziyskogo poyasa stepy I tys. do n.e. (po materialam yuzhnogo Priuralya), in A.D. Stolyar (ed.) *Skify. Hazary. Slavjane. Drevnyaya Rus'. Materialy mezhdunarodnoy konferentsii, posvyaschennoy 100-letiyu so dnya rozhdeniya professora M.I. Artamonova, 9–12 dekabrja 1998 g.*: 45–50. St. Petersburg: State Hermitage Publishers.

Zuev, V.Yu. 1998*b*. *Prokhorovskie kurgany v yuzhnom Priurale i problema khronologii rannesarmatskoy kultury. Avtoreferat dissertatsii na soiskanie uchenoj stepeni kandidat istoricheskih nauk*. St. Petersburg: State Hermitage.

Zuev, V.Yu. 1999. O putyah resheniya 'problemy III v. do n.e.' v periodizatsii arkheologicheskih pamyatnikov sarmatskoy epokhi. *Stratum plus* 1999/3: 305–24.

Zuev, V.Yu. 2000*a*. Problemy khronologii 'rannesarmatskoy' kultury i kurgany u derevni Prokhorovka, in V.Yu. Zuev (ed.) *ΣΥΣΣΙΤΙΑ: pamyati Yuriya Viktorovicha Andreyeva*: 304–30. St. Petersburg: Aleteyya Publishers.

Zuev, V.Yu. 2000*b*. Osnovnye problemy khronologii 'rannesarmatskoj' kultury, in V.N. Myshkin (ed.) *Rannesarmatskaya kultura: formirovanie, razvitie, khronologiya. Materialy IV mezhdunarodnoy konferentsii 'Problemy sarmatskoj arkheologii i istorii'*: vol. 1, 85–104. Samara: SNC RAN.

Zuev, V.Yu. 2004. O nekotoryh popytkah modernizacii sarmatskoy periodizatsii, in I.I. Marchenko, M.G. Moshkova and B.A. Raev (eds) *Sarmatskie kultury Evrazii: problemy regionalnoy khronologii. Doklady k 5-y mezhdunarodnoy konferentsii 'Problemy sarmatskoy arkheologii i istorii'*: 205–19. Krasnodar: OOO 'Firma NSS'.

Zuev, V.Yu. and R.B. Ismagilov 1995. Korsukovsky klad, in D.G. Savinov (ed.) *Yuzhnaya Sibir v drevnosti*. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Sciences.

Zuo Ming 1974. Woguo chutu de shihua de rouhongshisui zhu [Etched carnelian beads found in China]. *Kaogu* 6: 382–85.

Zuravlev, D.V., E.Yu. Novikova and M.S. Shemakhanskaya 2014. *Yuvelirnye izdelija iz kurgana Kul-Oba v sobranii Istoricheskogo museja (Istoriko-tehnologicheskoe issledovanie)* (Trudy gosudarstvennogo Istoricheskogo Muzeja 200). Moscow: State Historical Museum.

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Masters of the Steppe: the impact of the Scythians and later nomad societies of Eurasia consists of 45 papers presented at a major international conference held at the British Museum in 2017 on the occasion of the BP exhibition *Scythians: warriors of ancient Siberia*, both conference and exhibition being jointly organised with the State Hermitage Museum. There are 58 contributors and co-authors from 16 countries, mostly from Russia, Ukraine and Kazakhstan, but also America, Britain, France, Germany, China and Mongolia. The papers range from new archaeological discoveries, results of scientific research and studies of museum collections to reconstructions of social elites, the phenomenon of monumental tomb construction, and 'Animal Style' art. Most results are presented for the first time in the English language and they throw a completely new light on a huge range of aspects of the lives of Scythians and other ancient nomads of Eurasia, their horses, rock art and the working of precious metals, textiles and other materials.

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